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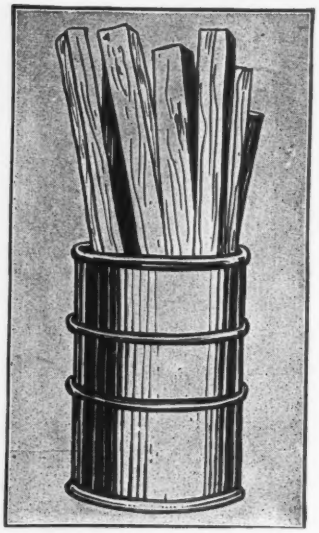
THE MOCKERNUT HICKORY



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AMERICAN FORESTRY

The Magazine of the American Forestry Association

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VOL. XXII AUGUST 1916 No. 272

The Hickories

Identification and Characteristics

BY SAMUEL B. DETWILER

THE hickories are characteristic American trees closely related to the walnuts, with a name derived from the Indian *"Pawcohiccora,"* a dressing eaten with hominy, made from the milk of the pounded hickory nuts.

"Tough as hickory" is a phrase suggesting the peculiar strength and elasticity of the hickory wood. General Andrew Jackson was endearingly called "Old Hickory" by his soldiers because of his tough, unyielding disposition. This nickname may have been bestowed during the war with the Creek Indians in 1813, when he fed his men on hickory nuts over a period when they were short of rations.

Twelve kinds of hickory are found in the world, according to Professor Sargent, eleven of them indigenous to the United States, east of the Rocky Mountains, and one Mexican species. Some botanists recognize fifteen members of the hickory tribe, while others consider there are but eight distinct kinds. Previous to the Ice Age, extensive forests of hickory existed in Greenland and Europe, but no hickories are now found growing in a state of nature outside of North America.

The area in which the hickories grow covers about one-third of the United States. The various kinds have distinct regions for their growth, but all of the important ones may be found growing in western Tennessee, northwestern Mississippi and eastern Arkansas. The hickories are picturesque members of the forest and have been called "the artist trees." In winter the armor-like bark, gnarled branches and stout twigs suggest tall, well-proportioned athletes of iron strength. In the springtime the tinted bud scales or dainty leaves and tasselled flowers make these trees as beautiful as many that bear more gorgeous blossoms. The summer foliage casts dense shade and outlines the tops in graceful symmetry. When Nature colors the autumn landscape, the clear yellow of the hickory is conspicuous for a brief time, and, though the leaves are shed suddenly, they retain their bright color long after they fall. It is an old belief that if the hickory leaves are a brilliant yellow in the autumn, the next harvest will be a rich one.

LEAF, FLOWER, NUT AND TWIG OF MOCKERNUT HICKORY

The leaves of the hickories have an alternate arrangement and consist of 2 to 5 pairs of separate leaflets on a central leaf stem tipped with a single leaflet. The pollen-bearing flowers appear shortly after the leaves. They are greenish scales hanging in long, slender chains, three in a cluster, from a common stem attached to the twig at the base of the spring growth. Each scale bears on its lower face from 3 to 10 little yellow stamen heads. From 2 to 11 flowers are borne in a spike at the tips of the twigs and develop into the fruits. These nut-forming flowers are small and colored

yellowish green like the young leaves surrounding them. Each flower consists of several tiny scales tightly enclosing a small globular body from the centre of which two small plumes protrude to collect the pollen as it floats through the air. The central part of the flower consists of four communicating chambers in which there is a single rudimentary plant. During the summer starches and oils are packed into the seed leaves of this little plant until they fill the four compartments and are known as the kernels of the nuts. With the frost of autumn, the husk splits into four parts, freeing the hard-shelled nut.

From Pennsylvania Trees
MOCKERNUT HICKORY

The Shagbark (*Hicoria ovata*), sometimes called the shellbark, is important not only because it produces nuts with large, finely flavored kernels, but also because of the high quality of its wood. Its leaves vary from 8 to 14 inches in length and commonly have five leaflets, but occasionally seven. The leaflets vary in size, the lower pair being small, the succeeding pair or pairs growing larger and broadening out at their tips, the single leaflet at the end of the stem being largest of all. The nuts are white, half an inch to an inch in length, and of about the same width, and are enclosed in a husk half an inch thick. They are considerably flattened with four sharp ridges on the sides, so that the nut is more or less four-edged. The Shagbark is one of the tallest hickories, sometimes attaining a height of 120 feet and a diameter of 3 or 4 feet but more often only about half this size. In dense forests the trunk is straight, tapering slightly and free from branches for the greater part of its length. In the open the trunk branches are low to form the narrow, open, cylinder-shaped top that is quite generally characteristic of the hickories. The long, ragged strips of dark-gray bark that clothe the trunk make this tree conspicuous and prove that "shagbark" is a well-chosen title. These strips may be 3 to 8 inches wide and 3 feet or more in length, and are frequently attached to the tree at the middle, leaving the ends of the strips swinging free. Young trees have smooth, greenish or grayish bark.

The Shagbark grows in rich, deep, rather moist soils, in valleys and on hillsides from southern Maine and Quebec west to Minnesota and south through the Appalachian Mountains to Florida and eastern Texas. The Big Shellbark (*Hicoria lacinosa*) has a more restricted range, being found from central New York and eastern Pennsylvania to Tennessee and Arkansas. This tree selects rich bottom lands, preferably sites that are flooded for short periods of time. It is closely allied to the Shagbark, growing equally tall, but seldom over 3 feet in diameter. Its bark is less ragged than that of the Shagbark and its leaves are longer (10 to 22 inches), consisting of 7 to 9 leaflets. The nut is longer and much broader than that of its nearest relative, dull white or yellowish in color, with 4 or 6 heavy ribs on its sides. The ends of the nut are usually strongly pointed, unlike the nut of the Shagbark, which is rounded or notched at the end, and the husk and the shell of the nut of the Big Shellbark are much thicker.

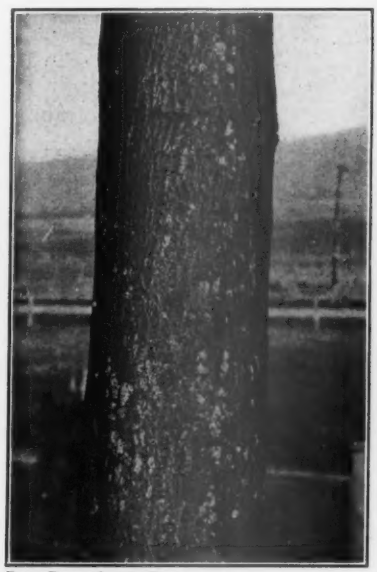
The North Carolina Shagbark (*Hicoria Carolinæ-septentrionalis*) has shaggy bark but it has smaller leaves, buds and fruit than the other shagbarks, and is a much smaller tree. It is distributed through the uplands of western North Carolina, eastern Tennessee and northern portions of Alabama and Georgia.

From Pennsylvania Trees
PIGNUT HICKORY

The Pignut (*Hicoria glabra*), the Small Pignut (*Hicoria odorata*), and the Mockernut (*Hicoria alba*), by some are called "Black Hickory." This term refers to the darker color of the bark. Because they have a high proportion of white sapwood, they are also called "White Hickory." The Pignut grows practically throughout the same territory as the Shagbark, except that it follows the Atlantic Coast to Florida, and is also found along a portion of the Gulf Coast. As a rule it chooses to grow in the dry soils of ridges and hillsides. Although it may grow 90 feet high and 3 or 4 feet in diameter, it is uncommon to find trees exceeding 2 feet in diameter and 60 or 70 feet in height. The trunk, straight and free from branches when growing in the woods, is apt to fork and form a double top when growing in the open. The dark-gray bark, which is tight and close, is separated by narrow, flattened ridges into small, diamond-shaped areas, on the order of the fissures in the bark of white ash, but less regular. The leaves are 8 to 12 inches long, with 5 to 9 leaflets (7 commonly, 9 rarely); unlike the Shagbark, the individual leaflets vary comparatively little in size or shape. The nuts are small (less than an inch in length), rounded or

pear-shaped, light-brown in color, with a smooth shell of variable thickness but usually heavy and hard to crush. The kernels are small, at first with a palatable flavor, but soon becoming strong and somewhat bitter, " fit only for pigs." The husk of the Pignut is thin and leathery, and the four valves do not separate readily from the nut or from each other like the thick " hull " of the Shagbarks.

Several varieties of Pignut are known to botanists, and one of these varieties is so different that by some it is considered a separate species, by others a cross between the Shagbark and the Pignut. This is the Small Pignut, which ranges from eastern Massachusetts to Maryland, west to Missouri and southern Illinois. It has rough, slightly shaggy bark. The small leaf usually consists of 5 leaflets, and the nut is small, thin-shelled and spherical. The kernel is sweet, and the thin husk splits to the base. The Pale-leaf Hickory (*Hicoria villosa*), found from New Jersey to Florida and westward to Missouri and Texas, was once considered a variety of Pignut, but has some of the characteristics of the Mockernut. It is a small tree growing on barren soil. The under surfaces of the leaflets are silvery, and the bark is deeply furrowed, but not shaggy.



From Pennsylvania Trees
BITTERNUT HICKORY

The Mockernut, Bigbud or Whiteheart Hickory has bark that is decidedly rough but does not loosen in strips. The color of the bark varies from light to dark gray. Shallow, irregular fissures separate the surface into broad, flat ridges, covered with tight-fitting scales. The Mockernut has the stockiest twigs and the largest buds found among the hickories. The leaves are 8 to 12 inches long, with 7 to 9 leaflets, and give forth a pleasant aroma when crushed. The large nuts are globular, or sometimes slightly compressed, with a nearly smooth and very thick brown shell. It contains a sweet kernel which is so small that it disappoints one who has taken the trouble to crack the heavy shell. Mockernut trees, 150 feet in height and 3 feet in diameter, are occasionally found, but the usual size is 50 to 75 feet high with a diameter of less than 2 feet. It grows on ridges or in rich valley soils over the same range as the Pignut and, like the latter, it does not form quite as long or as clean trunks as the Shagbark.

The hickories which have been described are alike in having nuts with hard, bony shells that are not easily broken. Another group of hickories, of which the Pecan and Bitternut are typical, produces nuts with thin, brittle shells. In the first group the winter buds are covered with numerous overlapping scales; in the second, the scales are in pairs, the edges of which meet like the two halves of a clam shell, to enclose the tender growing point of the bud. It is interesting to distinguish trees in winter by means of their buds, and the hickories offer an exceptional opportunity for this study. The buds of each species are as unlike and as easily distinguished from each other as the fruits and nuts. It is one of the pleasures of spring to watch the unfolding buds of the Shagbarks. The inner bud scales curl backward and enlarge until they are several inches long, and in their silky texture and gorgeous reddish tints resemble the petals of a flower.

From Pennsylvania Trees
SHAGBARK HICKORY

The Pecan (*Hicoria pecan*) is distributed from southern Iowa, Illinois and Indiana, western Kentucky and Tennessee to central Alabama and westward to southeastern Arkansas and central Texas. It is usually found on low, rich ground in the vicinity of streams. The Pecan is the loftiest and most imposing of the hickories, and one of the most beautiful trees of the South, rising to a height of 100 to 170 feet, with a maximum diameter of 4 to 6 feet. The trunk is more or less swollen and buttressed at the base, and branches into a broad top which is oval in outline. The leaves are a beautiful, bright yellow-green, 12 to 20 inches long, bearing from 9 to 17 leaflets. The nuts are 1 to 2 inches long, smooth, reddish and slender, but tapering at the ends, and so thin-shelled that they may sometimes be crushed with the fingers. The kernel is large and sweet. The thin, dark-brown husk splits into four sections nearly to the base, discharging the nut, and frequently remains on the branch during the winter.

Two trees bear the name of Bitter Pecan. One of these is *Hicoria Texana*, which grows sparingly over a small area in eastern Texas. It has leaves 10 to 12 inches long with 7 to 11 leaflets. The nuts are oblong, somewhat flattened and the shell is longitudinally grooved and roughened. The kernel is very bitter. The other Bitter Pecan, also called Water Hickory, is the least useful member of the family. It grows sparingly in river swamps from southeastern Virginia to Florida and along the coast of the Gulf States to Texas, extending northward through

the Mississippi Valley to southern Illinois. The leaf is 9 to 15 inches long, with 7 to 13 leaflets. The husk is thin and brittle and does not separate readily from the nut. The latter is one to one and a half inches long and nearly as broad, and with a much wrinkled, corrugated exterior resembling the shell of the butternut.

The Bitternut (*Hicoria minima*) has a long, clean trunk that may have a height of 100 feet and a diameter of 3 feet, but its ordinary height is 50 to 75 feet with a diameter of 1 to 2 feet. It is a handsome tree with a rounded top and glossy, bright green foliage. The leaves are 6 to 10 inches long, composed of 7 to 11 narrow leaflets, the smallest of all hickory leaflets. The bark of the Bitternut is light gray, thin, tight-fitting and roughened by a rather uniform network of narrow ridges and shallow fissures. The fruit is small and nearly spherical, with a smooth shell which is at times almost paper-thin and packed tight with an exceedingly bitter kernel. The kernels are so rich in fat that a hundred years ago they were sometimes pressed to extract oil for use in lamps and as a substitute for lard. The Bitternut grows in moist lands from Maine and Ontario to Florida and west to Minnesota, Nebraska and Texas.

The Nutmeg (*Hicoria myristicæ formis*) is a native of South Carolina, central Alabama and Mississippi and southern Arkansas. It grows in rich soils along rivers and in swamps, and sometimes on high land. It is a straight tree, 80 to 100 feet high, and often 2 feet in diameter, with stout spreading branches that form a narrow, open head. The bark is reddish brown, broken into small scaly plates. The leaves are lustrous dark green, silvery beneath, thin and firm of texture; they are 7 to 11 inches long and bear 5 to 11 leaflets. The nut is small and covered with the thinnest of husks which splits into quarters nearly to the base. Unlike the Bitternut, the nuts have a thick shell and the kernel is sweet.

The wood of the hickories is heavy, strong and very hard and tough, but it is not durable in the soil or exposed to the weather. It is noted for its flexibility and elasticity. The rings of annual growth are marked by one or more rows of large pores. The proportion of sapwood varies with the species and the age of the tree. It is white and very distinct from the reddish-brown heartwood.

Hickory trees growing near the northern limits of their range are liable to be injured by late spring frosts. Occasionally they suffer from a leaf-spot fungus and from some of their numerous insect enemies. The most serious of these is the hickory bark beetle, which has killed large numbers of hickory trees in the northern states during the past few years. The larvæ feed in the living cells between the bark and sapwood and girdle the trunks. This insect can be controlled by applying proper remedial measures, but this requires concerted action by all the owners of hickory trees in the locality and the work should be undertaken before the insects have become well established.

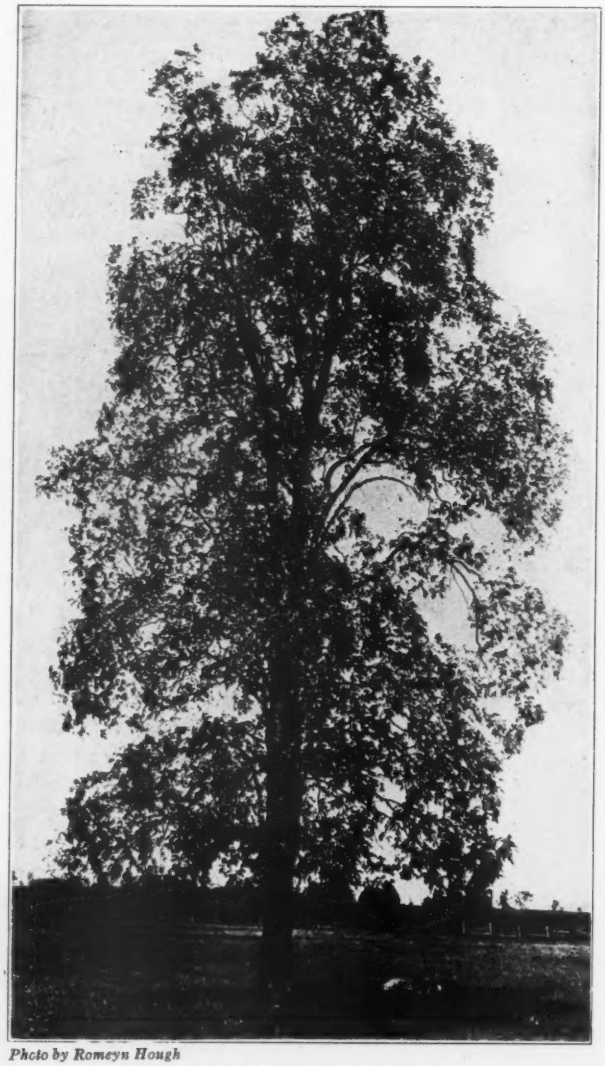


Photo by Romeyn Hough

THE SHAGBARK HICKORY

Note the characteristic tall, oblong crown even in field growth. By some this is called the national tree of America.

The hickories are desirable shade trees; the best for ornamental planting are the Pecan (hardy as far north as New York), the Bitternut, Shagbark, Mockernut and Nutmeg Hickory. The latter has many qualities that especially recommend it, but its hardiness in the northern states is not well known. The Pecan, Shagbark, and Big Shellbark are valuable for planting for nut production. The many horticultural varieties of pecans and the extensive planting of pecan orchards in the South are developments of recent years. It is only a matter of time when careful selection and breeding will add many more improved varieties of Pecan, Shagbark, Big Shellbark and perhaps other species.

The hickories have pronounced taproots which make it exceedingly difficult to successfully transplant seedlings from a nursery. Except the Bitternut, which is less sensitive, if the trees grow at all, they seldom have much vigor. The better plan is to gather the nuts as soon as ripe and plant them at once where the trees are to stand permanently. That this method is successful is demon-

strated by the many hickory trees that develop from nuts buried and forgotten by the squirrels. Since squirrels and other rodents are inclined to raid plantations when the hickory nuts are sown in the fall, spring planting is preferable. The nuts may be kept in fit condition for spring planting by burying them, well protected, in moist sand, but in this case they should not be covered deep enough to prevent the frost from cracking the shells.

Hickories grow slowly compared with many other trees and for satisfactory growth they require deep, rich soil. Some species are less exacting in regard to soil than others, and it is always well to study the natural conditions under which these trees grow before attempting to plant them. The Pecan grows more rapidly than any of the other species and may produce a small amount of fruit in ten years.

Commercial Uses of the Hickory

THE first explorers of eastern North America called the hickories "walnuts" because they slightly resembled the Circassian walnut, with which they were familiar. Captain John Smith wrote of "pawcohiccora," the pleasantly flavored dressing which the Indians ate with crushed corn. The squaws crushed hickory hulls and nuts in a wooden mortar, to which water was added until it formed a milky liquid. The name used by the Indians was given to the trees by the early settlers, being shortened into hickory.

The ripe hickory nuts furnished the Indians with a valuable part of their winter food, and some tribes gathered large quantities, especially in the South, where a single family sometimes stored a hundred bushels. In the eastern United States and the Mississippi Valley, the Indians made most of their bows and war clubs of hickory wood. In the early part of the summer, bark peeled from young hickory trees was used for ropes and cords. During the rest of the year, hickory withes—the stems of young seedlings or sprouts made pliable by twisting—were used to tie bundles, bind wigwam poles together, and for similar uses. The early settlers frequently substituted hickory withes for rope, wire or nails, and many farmers still find them useful in an emergency.

Hickory sap furnished an ointment or liniment which was once used to "supple the joints." Dry and decayed hickory wood made the best punk in a day when flint and steel had not been replaced by the convenient matches. This fact was learned from the Indians, who likewise taught the settlers how to preserve meat with hickory ashes. The old-fashioned home-cured hams were given their exceptionally rich flavor by curing them in smoke from a hickory fire. Hickory wood was also preferred for curing tobacco artificially because it produced a steady heat, burned for a long time and required little attention. The farmer's wife made special provision to save the hickory ashes in the ash hopper for soap making. Old-time blacksmiths used hickory charcoal before coal and coke were available. Strips of hickory bark and hickory splints were much used in weaving baskets, chair seats, and other home-made articles of furniture. For nearly 200 years the split broom, usually made from hickory, was the principal apparatus for sweeping. A section of a sapling, 4 or 5 feet long and 2 or 3 inches in diameter, was chosen and the butt end was shaved into a thousand or more thin splits, each about 10 inches long, without detaching them from the stick; when the splits were tied together with string, the broom was ready for a year's service.

HICKORY BARK BORERS
The holes made by the hickory bark borers which have developed under the bark and bored their way out.

Many old-time appliances made of hickory, such as swingles, cringles, hand fids and gluts, are long forgotten. Hickory ramrods were used in loading the long rifles and muzzle-loading shot guns. No other wood was considered suitable for ax handles when hickory could be obtained. The smooth, slender, yielding handles made American axes famous for their efficiency. Hickory has long been and will continue to be a favorite for handles of all kinds. Hoop making was one of the early industries that consumed large quantities of hickory saplings. Hoop poles were 1 to 2 inches in diameter and from 9 to 15 feet long. They were used for hooping many kinds of barrels, kegs and tubs, but probably more were used on tobacco hogsheads than any other container. Cutting hoop poles was responsible for the destruction of immense numbers of fine young hickory trees and it is only through the

invention of improved hoops in rather recent years that this drain on the hickory supply was checked.

The principal supply of commercial hickory comes from Tennessee, Arkansas, Kentucky, Missouri, Indiana and Ohio, although some hickory is produced in thirty-three or more states. It is estimated that the yearly output of hickory lumber in the United States is less than four hundred million feet, board measure. The wood of the various kinds of hickories varies in hardness, elasticity, weight and color. Users of hickory seldom make distinctions according to species but depend on inspection to secure the kind of wood that meets requirements. Some species are so lacking in good qualities that they are seldom cut for the market. "Second growth" hickory comes from trees which have grown rapidly on land from which the large trees have been lumbered, or from trees growing in the open. The greater value of this wood lies in the fact that the wide rings of annual growth have a high proportion of dense summer wood.

HICKORY FOR VEHICLE PARTS

Hickory is first in importance among the woods used in vehicle parts, red and white oak being next. The photograph shows hickory and oak spokes piled for seasoning in the plant of a large hub and spoke manufacturer.

Pin-hole borers sometimes lessen the value of the wood of live hickory trees. A greater loss is due to "iron streaks." This defect is caused by a discoloration of the wood which starts in small holes through the bark made by the sap-sucker, a species of woodpecker that is very fond of the sweet sap of the hickories. The discoloration affects the appearance of the wood rather than its mechanical qualities. After hickory wood is cut and is being seasoned, it is very liable to be attacked by beetles that honey-comb the lumber, leaving behind them large quantities of powdered wood. After the beetles are at work, little can be done to save the lumber, but they may be kept out of newly sawed lumber by sprinkling it with oil.

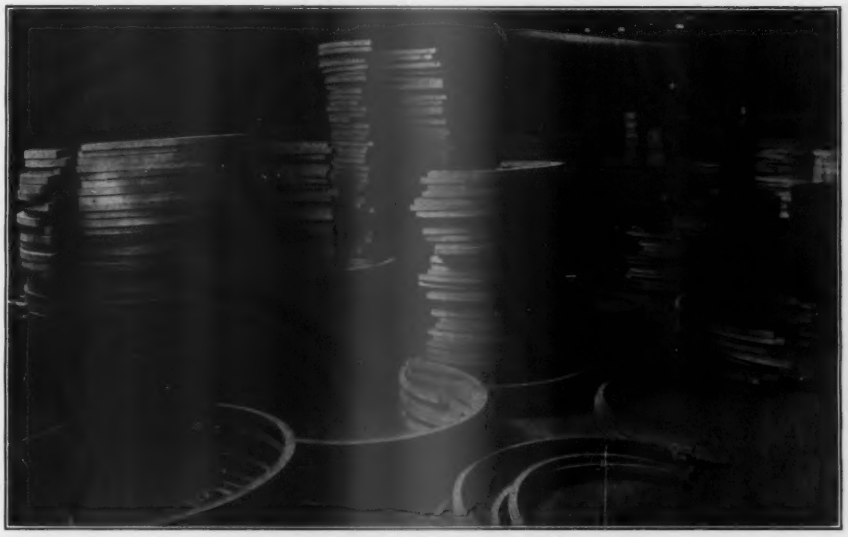
Shagbark is generally believed to furnish the highest quality of hickory wood, and to best meet the severe requirements of carriage and wagon work. The Big Shellbark hickory has wood that is very similar and almost equally valuable. The Pignuts produce wood of high quality which is used to a greater extent than that of any other of the smooth bark hickories. The Mockernut has darker heartwood than the Pignut but the wood is about the same in quality. These trees have a wide ring of sapwood surrounding the heart and for this reason have been preferred for certain uses because it was believed that the sapwood was stronger than heartwood. Investigation has demonstrated that there is no perceptible difference between heartwood and sapwood except that the heartwood is more apt to be knotty. Much hickory that was formerly wasted because of "red heart" is now accepted by the inspectors. Hickories in the Shagbark class have thin white sapwood, light-brown heartwood and the wood is more apt to be straight-grained and free from imperfections than the wood of Pignut and Mockernut.

Bitternut hickory is not regarded as producing a high class of wood for commercial use. The thin sapwood partly accounts for the prejudice against it and it is probable that in the future this wood will be more highly rated.

Nutmeg hickory has wood of fair quality but is not much used because the tree is limited in its distribution. Water hickory and Pecan all produce wood that is comparatively weak and light in weight. Their wood is of slight commercial importance because it is inferior in every respect to the other hickories.

Much hickory was formerly used in agricultural implements that were manufactured on the farm or in the local wheelwright shop. Among these were mauls, flails, plow handles, cradles, scythe snaths, ox yokes, and rakes of all kinds. Dozens of modern farm tools and machines ranging from plows, planters and cultivators to reapers, stackers and fertilizer distributers could not well dispense with the hickory that forms various parts of them. The

manner in which hickory is now employed is largely a fuller development of its earlier uses. Nearly one-half of the hickory used by manufacturers of the United States enters into the construction of vehicles and at least one-third into handles of various kinds. Agricultural implements probably follow these in the amount of hickory used. Carriages and buggies are American inventions made possible through the superior qualities of hickory wood. Not only have they been highly important business and pleasure vehicles for millions of Americans, but they have been sent to all parts of the civilized world and may be seen in central Africa or the deserts of Arabia, or traversing rocky roads in India. Hickory surpasses any known wood in its ability to resist the excessive strains to which the spokes of light carriage wheels are subjected. No other country has wood to make vehicles so light in weight yet so strong and durable.



HICKORY USED FOR WHEEL RIMS

The tough hickory has always been one of the most serviceable of woods for uses requiring qualities of great resistance to heavy wear and severe strain.

Credit must be given to hickory wood for the development of our famous American trotting horses, for the splendid qualities of this wood made it possible to build racing sulkies of a lightness never before known. In the light rim of the swiftly moving bicycle wheel, hickory is just as serviceable as in the humble wheel-barrow. Other woods serve well for heavy vehicles; nevertheless, hickory is largely sought for spokes, felloes and other parts of heavy wagons and automobiles. It is used in dump-carts, drays, stone-wagons, and sleds of all kinds. The sledges used by Shackleton in his Antarctic expedition in 1908 had runners of specially selected split hickory because severe tests demonstrated that the wood wore better than German silver or other metal runners.

Some hickory is used in the manufacture of cheap furniture, especially for chair rounds. Adjustable wheel chairs and children's high chairs employ considerable hickory in their construction, and in recent years it has come into vogue for rustic furniture. Other commodities made of hickory are oil-well sucker rods, which may be 30 or 35 feet long, and the skewers used by butchers. Canes, ladder rungs, trunk slats, dowel pins, wedges, crochet rings, pins used in the manufacture of artificial limbs, and insulator pins for telegraph and telephone lines consume small amounts of hickory in widely different ways. The wood is especially suitable for the manufacture of spring bars, croquet mallets, tennis racquets and other athletic goods, and it is also excellent for fishing-rods. Some hickory is also used for crates and boxes where exceptional strength is required.

Hickory is an ideal winter fuel and the big fire-places of our forefathers burned many cords of as fine hickory as ever grew. It is just as popular for the open fires of to-day, for it burns slowly, with little smoke, making a hot, bright, companionable fire.

The nuts are the most important by-product of the hickory trees, and in the case of the Pecan, the returns from the sale of its nuts exceed the commercial value of its wood. The bark of hickory contains a yellow coloring matter which has been used as a dye, but is of small utility.

WOOD WASTE EXCHANGE

EXTENSIVE use by lumbermen and wood-working factories of the wood waste exchange conducted by the Forest Service is reported by officials who have just completed a short field study to determine the extent to which the opportunities offered are being taken advantage of. Only a small per cent of the total number of concerns listed were visited, but a comparatively large number were found to have benefited by the exchange.

Makers of wooden novelties, it is said, have been particularly successful in finding supplies of material near their plants. Other wood-working industries have been able to dispose of their waste at higher prices than they could otherwise have obtained. Many of the firms were located within short distances of each other, but until recently have had no way of getting together.

The wood waste exchange was established by the Forest Service in 1914. It consists of two lists of manufacturers, which are sent out quarterly to persons desiring them. One of these is of "Opportunities to Sell Waste," and contains the names of firms which use sawdust and small pieces of wood. This list is sent to plants having waste for sale. The other list is of "Opportunities to Buy Waste," and gives the names of concerns which have waste to dispose of.

There is no charge for the service and any manufacturer who wishes to have his name added to either list can do so by writing to the Forest Service, Washington.

Photo by Gifford for Northern Pacific Railroad

ONE OF THE BIG FEATURES OF YELLOWSTONE PARK

The terraces of the Mammoth Hot Springs change in color from time to time. Nature seems here to be possessed of that character of restlessness that prompts the housewife to rearrange the living-room furniture and the sea-shells on the what-not from time to time. At least, she does it with the brush of a master artist.

Yellowstone National Park

By Mark Daniels

Former Superintendent of National Parks

LIKE the Grand Canyon of the Colorado, the Yellowstone National Park has occupied the spotlight of public attention to such an extent that any attempt to add to the public knowledge of its wonders and fascinations is like carrying coals to Newcastle. However, in consideration of the fact that the public has been more or less submerged with a flood of literature and lithographs, colored by hand with hues selected from paint-pot born of a printer's imagination, further comments upon the Park based upon actual knowledge may appear less like heaping coals of fire upon the head of the long-suffering tourist. As a matter of fact, the sky over Yellowstone National Park is not shell pink, the trees are not blue, the waters of the great lake in no wise resemble red ink and the geysers do not spout streams of molten metal, as one might be led to believe from some of the railroad literature colored in the way above described. Further than this, it is quite possible to traverse the woodland trails and pass many trees without seeing a single grizzly poking his inquisitive nose from behind the tree trunk, nor do the buffaloes and antelopes crowd the tourists and stages from the highways. In fact it is quite possible to spend a delightful week in the Park without being seriously molested by "denizens of the woods," as the pseudo nature lovers delight in calling the hapless bears and other animals of the Park.

It is true that buffalo, antelope and bear abound in this largest of our National Parks, and that they may be seen without serious inconvenience or difficulty, but that they are so numerous as to interrupt one in the pursuit of insouciant pleasures, is purely a figment of the publicity expert's imagination. I remember that for years, as a boy, it was the ambition of my young life to spend a few weeks in Yellowstone National Park where a natural fleetness of foot would be greatly augmented by the exciting pleasure of dodging silver-tipped grizzlies and climbing trees to elude the vicious horns of the man-eating buffalo, and I have no doubt that there are many young boys in the United States whose sleep is filled with dreams of canyons and forests in Yellowstone National Park, over-crowded with beasts of prey.

Undoubtedly there are more natural phenomena to be seen in Yellowstone National Park than in any other equal area in the United States. Add to this the fact that there is a great lake fifteen miles wide at its widest point, and twenty miles long, the placid surface of which is seventy-eight hundred feet above the sea level, a great gorge of rainbow hues through which a mighty river roars on its way to the sea, hundreds of square miles of great forests and broken, saw-toothed crests silhouetted against the sparkling skies, and you have a combination which will inspire almost anyone to an unrestricted and

profuse use of the English superlative. In addition to the almost innumerable wonders of the Park, the locality is pervaded with an atmosphere of bigness. Everything is on a giant scale. Distances are great, canyons are of a terrifying depth, mountain peaks raise their lofty crests to inconceivable heights, and even the length of the Government roads is made inconceivably long by the intolerable dust which Congress refuses to lay for the tourist. It is not surprising, therefore, that exaggeration creeps into a discussion of the Park, and that descriptive writers take liberties with truth.

ern entrances, which are tapped by the Northern Pacific Railroad and the Union Pacific, respectively. In the early history of the Park, most of the travel came in by the northern entrance, which is but a few miles from Fort Yellowstone, where, at one time, was stationed a very considerable force of cavalry. Since that time, however, this force has been reduced and the interest in the old fort is now secondary to the greater number of imposing spectacles that may be witnessed from the main circuit, which is considerably closer to the western entrance. As a result, the tourist whose time is limited will generally

Photo by Gifford for Northern Pacific Railroad

CARELESS TOURISTS ARE INJURED HERE

While the Grotto Geyser does not present such a spectacular performance as Old Faithful, it is still one of the most interesting in the Basin. In addition, it permits of a closer inspection while in operation, a privilege that seems to be held at a premium by the tourists, who are often injured through succumbing to curiosity.

As Yellowstone is the oldest of our National Parks, it is to be expected that it is opened up with roads and trails to a much greater extent than any other Park in the system. Fortunately, a certain degree of intelligent forethought seems to have been exercised in the planning of the roads in the Park. There are four entrances, each about in the middle of a boundary line of the Park, which lead to a central circuit on which are located most of the interesting features to be visited. There is also another circuit in the northern portion of the Park, a portion of which is contiguous to the main circuit, so that the encircling roads form a figure eight. One may enter the Park, therefore, from any one of its four sides and strike the circuits, thus giving a choice of several different routes of travel.

The entrances most used are the northern and west-

choose the Union Pacific line, entering at Yellowstone on the western entrance, and make only the main circuit.

From Yellowstone the road follows the Madison River to its junction with the Firehole River, where it branches. One road follows the Gibbon River to the north, while the other follows up the Valley of the Firehole. The road along the Firehole is particularly beautiful, as it clings for miles to the very edge of the river until it reaches what is known as the Lower Geyser Basin. In this Basin are the famous Mammoth Paint Pots, which are really nothing but mud geysers, the contents of which look and act like nothing so much as vividly colored mush that is being boiled and tossed by escaping steam. In this Basin, also, are the Fountain Geyser, Emerald Lake and the Fountain Hotel. To some tourists the latter is quite the most curious freak to be found in the Basin,

although any antipathy which one may feel for its bastard architecture is soon forgotten in the delights of the well-cooked food that is served inside.

On the regular trips, the Fountain Hotel, which is only a lunch station, and the next stop, the real Mecca of Park tourists, is reached about four o'clock in the afternoon. Here are the famous Old Faithful Geyser and Old Faithful Inn at the upper levels of the Upper Geyser Basin. The two places at which most tourists spend the majority of their time are in the Upper Geyser Basin and at the Canyon Hotel on the brink of the Grand Canyon of the Yellowstone.

Speaking of architecture, it is difficult to place the Old Faithful Inn in any category, but despite its curious and rather unattractive massing, the hostelry is pervaded with an unusual amount of charm and an atmosphere of real comfort. From the windows of many of the rooms of the hotel, and from the veranda, Old Faithful Geyser may be seen to spout, with its never interrupted regularity, at intervals of one hour and five minutes. From the veranda may also be seen many of the geysers across the road on the eastern border of the Basin, and the entire surrounding has the appearance of a manufacturing town with the innumerable jets of steam rising from unseen escapes. It has the desirable feature, however, of lacking the roar that frequently becomes nerve racking in the vicinity of the Fountain Hotel.

There are a great number of intensely interesting points of interest in the Upper Basin, prominent amongst which are the Grotto Geyser, Punch Bowl, Sunset Lake and the Rainbow Pool. However, unless the tourist is prepared to remain in the locality for twenty-four hours or so, it is quite possible that few of the geysers will be seen in action, with the exception of Old Faithful. But the brilliant colors of the pools and hot basins alone would justify the trip if the tourist is forced, by shortness of time, to continue on schedule.

The next link in the circuit is from Old Faithful to Thumb Station on the western shore of Yellowstone Lake. The road between these two stations crosses the Great Divide twice in the journey and extends little more than this fact in extenuation of the disagreeable circumstances of the trip. It follows along Spring Creek and crosses the Divide in both places so easily that it is difficult to realize that there is any Divide lurking in the vicinity, particularly as the dust might make it practically impossible to see such a thing if one were still interested.

Photo by Gifford for Northern Pacific Railroad

THE YELLOWSTONE FALLS

These falls are not so high as many others. Compared in height with the Yosemite falls, it is equal to any. Over its precipice leaps a mighty river and, as an illustration of bounding energy, it is unexcelled. The proportions are just about right to come within the scope of human intelligence, thus making its beauty more readily grasped.

From Thumb Station, there is a choice of two routes, one by wagon road and one by launch on the Lake, to the Lake Hotel at the upper end of Yellowstone Lake. It is difficult to imagine anyone choosing the road after the ride to Thumb Station, and, in addition, the boat ride is one of the most beautiful that can be had on any lake in this country. The route traversed by the launch is about fifteen miles in length, half of which is spent in the western extension of the Lake, known as the West Thumb. After passing Dot Island, the boat swings close to Stevenson Island and lands at the wharf in front of the Lake Hotel.

Here is another excellent example of the work that has been left undone by the Board of United States Geographic Names. Some of the most prominent points and features in and on this most wonderful of lakes have been named West Thumb, Rock Point, Steamboat Point, Bridge Bay, Frank Island, and, wonder of wonders, Dot Island. The latter is only exceeded in the absolute idiocy

of its cognomen by Spot Mountain in Glacier National Park. Is it any wonder that storms blow up on this Lake with such fury that they seem to be launched on to renewed violence in order that they may tear from the heart of the Lake those elements which have been cursed by man's ignorance and lack of imagination?

By most tourists the Lake Hotel is approached with a spirit of keen and trembling anticipation, for all along the line information has been slyly supplied to the effect that here will be found the monarch of the forests, and for once, this form of gratuitous information proves correct. Out back of the hotel, there is an open space where, for a number of years, the proprietors have been dumping the refuse from the dining-room. Why the dumping is done at the rear, rather than in the front, cannot be explained on any other grounds than the fact that it is closer to the kitchen, for nothing could add to the inconsistency of this combination of colonial architecture and western box wood-work painted a vivid yellow. Be that as it may, the dump grounds are well to the rear of the hotel, and for several generations of bears this area has been the dining-room of the wild animals that are so elaborately described in railroad literature. It is true that on hot days those who are enjoying a cold in the head will find their affliction a distinct advantage, unless the bears may have eaten all the refuse before it had time to give other than ocular evidence of its presence. At almost any time in the day, one or two bears may be found on the dumps, but these are invariably of the family of Black Bears. The Grizzly, it appears, is more regular in his habits and dines only between the hours of six and eight in the evening. Perhaps this regularity in habit accounts for his unusual physical development and it is pride of race that keeps him to schedule, but in any case, it is useless to seek a glimpse of the great grizzly at any other time.

There has been for some time a mother bear and two cubs of the Black family that seem to have become more inured to the extravagance in language and dress on the part of the tourist than the other bears, for they are frequently found within a few yards of the kitchen steps of the hotel and may be snapped with kodaks, fed with cake and crusts, and otherwise annoyed, with more or less impunity. At the risk of starting a controversy over a word which has, in the minds of certain predatory corporations, been much over-used, I would suggest that the tourist carry on his annoyances of the bears within "reasonable limits." There is a story of one man who had grown so passionately fond of life in the open that he took his blankets and slept by the edge of the lake in front of the hotel. Whether his preference for this location as against a couch in the hotel was prompted by a sincere love of nature or an antipathy for the accommodations offered, has never been ascertained, for, during the night a grizzly, smelling the bacon under his pillow, aroused him to such an extent that his movements were interpreted as threatening to all bears. Prompted, therefore, by the first law of nature, the grizzly swung on him with sufficient force to throw him completely " through the ropes " and into the Lake, some fifteen feet away, during which flight the nature lover scattered various and sundry parts of his anatomy en route. Having completed his knock-out, the bear ambled on his way, munching bacon, and the man lived only long enough to give a few meager facts of the case.

The next day's journey follows along the Yellowstone

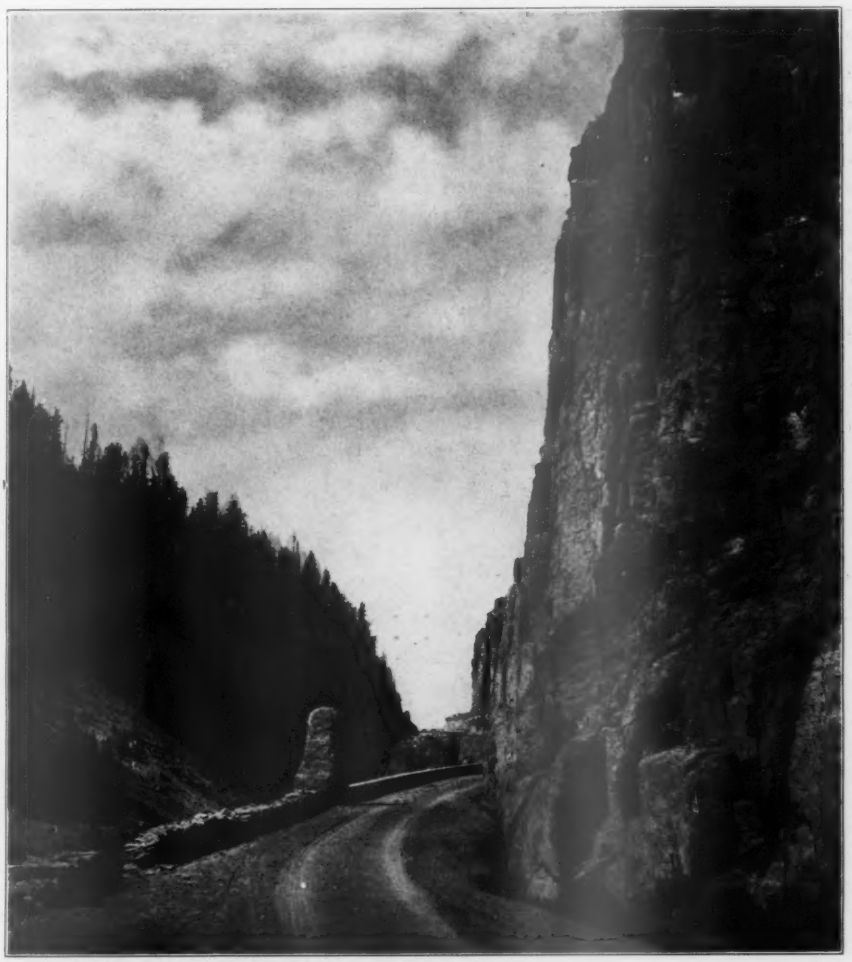


Photo by Gifford for Northern Pacific Railroad

THE GOLDEN GATE

This is a pass through which the government road runs. It looks as much like a gate as it does like gold, and is, therefore, as well and as aptly named as almost any other prominent feature of the Park. Perhaps it should be a source of gratification that it was not named Politics Portal.

River to the Canyon Hotel and the finest scenery in the Park is to be had in this vicinity. There is no doubt that the Falls of the Yellowstone River in this Canyon are among the finest to be seen in the world. At the Upper Falls the entire river passes over a sheer drop of one hundred and nine feet. The Lower Falls is a sheer drop of three hundred and eight feet. The Canyon, itself, is approximately one thousand feet deep, and its walls and sloping sides are of the most varied hues imaginable. It is not of a character that discourages intimacy in the way the Grand Canyon of the Colorado does, but, on the contrary, seems to invite closer association and acquaintanceship. I met Elbert Hubbard scrambling around half way down on the side of the Canyon on a hot day, and after he had finished a rather lengthy discussion of the inadvisability of admitting automobiles to the Yellowstone National Park, wiping, meanwhile, from his eyes, drops of perspiration, he told me that in all his travels he had never been in a place where intimate association with stupendous things seemed so possible or was so enjoyable. Perhaps it is well that he did not live to see Yellowstone National Park, which he loved so dearly, desecrated, as he thought it would be, by hordes of automobiles over its highways, but I am of the opinion that it is a great pity he did not live to experience a complete revulsion of feeling in this regard upon a full realization of the greater joys that automobile permits bring to the large numbers of those who delight in touring this Park. The question of admitting automobiles in the Yellowstone had been brought up prior to this time, and since I, for one, had strongly recommended their use to the Secretary of the Interior, I was therefore obliged to take issue with Mr. Hubbard on the question. However, the order admitting automobiles was given at about, or subsequent to, the time of his death, and we therefore came to no blows over the question. As a matter of fact, most of the blowing has been since, for which many of those who were originally interested in the issue are profoundly thankful.

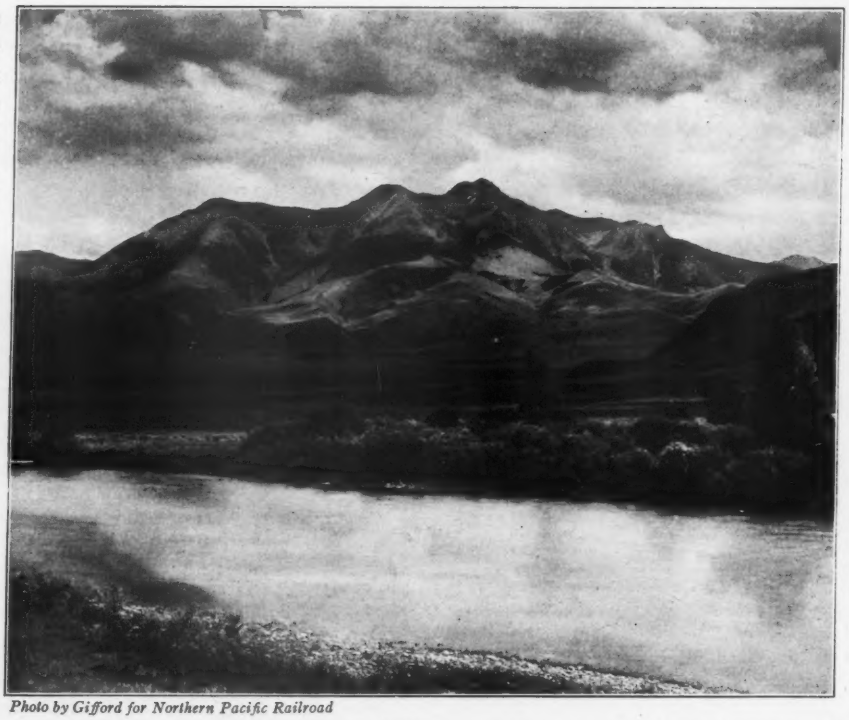


Photo by Gifford for Northern Pacific Railroad

IMMIGRANT PEAK OVERLOOKS A PEACEFUL STRETCH OF THE YELLOWSTONE RIVER

In this Park, so marked with evidences of Nature's violence, the beautiful meadows and charming valleys that are so frequently encountered fill the observer with surprise and delight. Instinctively the eye sweeps the tawny hills in search of grazing cattle.

There is one trip from the Canyon Hotel, which should, by no means, be overlooked, in spite of the fact that so few take it. This is up the Mount Washburn Road to the summit of the Mountain. The regular road from the Canyon to the next station at Tower Falls traverses most of the route, but at Dunraven Pass the road to the summit branches to the right and climbs to an elevation of approximately ten thousand feet above the sea. From this point one of the most commanding views that is to be had in the Rockies may be enjoyed, and if one is fortunate, intimate peeps of mountain sheep may be had along the road.

The Canyon Hotel is one of the stations that are on both circuits so that it is possible to return by the way of Norris Basin and see more geysers, or to continue by the Dunraven cut-off to Tower Falls, and thence to the Mammoth Hotel at Fort Yellowstone. The most popular route is by the way of Norris Basin to the Mammoth Hotel. Undoubtedly the reason is that along this route more natural phenomena are to be found, although the scenery is not nearly so good. Along the route by Tower Falls, Dunraven Pass is traversed and some petrified trees may be seen. Otherwise, there is nothing of interest save wonderful and glorious scenery which, it must be acknowledged, does not compete very successfully, for the attention of the average public, with freaks of nature.

Not that the road by the way of Norris Station is lacking entirely in scenery, for it is beautiful throughout its length from the Norris Basin to Fort Yellowstone. It follows the bed of Obsidian Creek through a more or less open country with beautiful meadows and forests on either side, and threads another pass in the mountains

where the engineering work seems to have justified that thrill of inspiration which resulted in naming the pass "The Golden Gate."

Fort Yellowstone has quite an air of romance surrounding it. It was at one time the headquarters of a large force of cavalry and housed some of the most distinguished soldiers in the United States Army, many of whom received their medals of distinction in the Indian fights in the Northwest. The vacant buildings carry one back to active times and bring a blush of shame over the lack of a more intimate knowledge of American history.

Photo by Gifford for Northern Pacific Railroad

NOT MANY OF THESE GREAT ANIMALS LEFT

There are but a few herds of buffalo left in the United States. One belongs to an Indian family and has been reduced in number by several recent sales to other countries than the United States. It would appear that Congress is determined to carry on the work of exterminating the buffalo that was started by the plainsmen a generation ago, for the Government has refused to do anything to prevent foreign purchase of buffalo.

One of the most interesting natural phenomena in the Park is the Mammoth Hot Springs, which is built of a number of terraces formed by the depositing of salts from solution in the hot water of the springs. The colors of these terraces change from day to day, and offer a never ending source of interest and wonderment to the visitors.

From the Mammoth Hotel at Fort Yellowstone, the tourist can depart from the Park by the way of Gardiner Station at the northern boundary, or return by the way of Yellowstone on the western boundary. It seems most advisable to take the trip from the Canyon Hotel over Dunraven Pass by the way of Tower Falls to Mammoth Hotel and out again by the western entrance, for by this route, all the roads of each of the two circuits are traversed, with the exception of a short link between the Canyon Hotel and the Norris Basin, which is, perhaps, the least interesting of the necessary links to complete the circuits, although it is more picturesque than some of the essential stretches of road.

The Park is the largest in our system and contains over two million acres. It is ridiculous, therefore, to consider that anyone can really see any material portion of its vast area in the length of time that is usually devoted to a trip in the Park; there are hundreds of miles of trails, innumerable lakes, streams and wonderful mountain peaks, together with an infinite variety of natural phenomena, all of which offer sufficient interest to entertain the most exacting for a period of several months; in fact, many tourists who wish to see the geysers have not sufficient time to take the entire circuit and are forced to enter the Park at one side or another, visit the nearest basin or two and depart. This, the Government now permits, although there was strenuous effort put forth on the part of concessionaires to enforce the tourist to stay in the Park a sufficient length of time to guarantee the operations of the concessionaires.

The introduction, therefore, of the automobile, has been a tremendous advance in the sensible administration of this Park, for it is now possible to cover by motor practically all of the roads that the Government has built in the Park in considerably less time than it would take to cover one circuit by horse-drawn stage. There is still plenty of work for the horses to do in the Park in the way of transporting people by saddle over the trails and giving them a more detailed knowledge of the mountains, so let us hope that the good work will go on and that the roads in our parks may be made safe for the automobile travel which is undeniably inevitable.

WOOD WASTE USED FOR PULP

THE use of a steadily increasing amount of wood waste in the manufacture of pulp is indicated by figures compiled by the Forest Service. Although the pulp industry showed a decline in the last year for which complete figures are available (1914) on account of the increasing cost of raw material and general business conditions, more wood waste was used than in any previous year.

Approximately 330,000 cords of waste with a value of $1,400,000 were utilized by 35 of the 200 pulp and paper mills of the United States. It is thought that as the price of cord wood goes up the amount of wood waste used will become greater.

The Bird Department

By A. A. Allen, Ph.D.

Assistant Professor of Ornithology, Cornell University, Ithaca, N. Y.

THE COLORATION OF BIRDS

IF YOU have followed the hoarse song of the scarlet tanager and found him perched on some dead branch ablaze in the sunlight; if you have noted the emerald back and ruby throat of the hummingbird as he flashed through the garden; or if you have seen the indigo bird change from pale to deepest blue and then to black, you must certainly have begun to wonder at the marvels of bird coloration. Then if you have tramped the woods and heard the grouse rumble from the roadside and the woodcock go whistling from under your feet, or if you have tried in vain to locate the vireo singing in the tree top, you must have been struck with the law of Nature that causes her children to be clothed so differently. For the grouse and the woodcock and the vireo in their haunts are as invisible to the untrained eye as though they were but a part of the sticks and leaves that surround them, while the tanagers and hummingbirds hold the eyes of even the least observing. What, then, are the laws determining that one bird shall be clad like the sun and his neighbor like the soil? What is the reason for this brilliancy on the one hand, and how is the concealment, on the other, brought about?

A RUFFED GROUSE ON ITS NEST

A good example of protective coloration. The grouse is "counter-shaded" and its color pattern is similar to that of the sticks and dead leaves about it.

We might first distinguish between the colors of a bird's plumage and the bird's coloration, because a large part of the coloration of most birds is not caused by actual pigments but more by the refraction of light through the structure of the feathers. A scarlet tanager is red in any light because the red is a pigment, but an indigo bird or a bluebird is blue only by reflected light when refraction occurs. The only pigments that have been found thus far in the feathers of birds are reds, yellows, browns, and black. Green pigment occurs in the African plantain-eaters, but in other birds the green is due to a yellow pigment overlaid with a superstructure of microscopic longitudinal ridges or polygonal bodies that refract the light. Blue and all the metallic colors are due entirely to this process of refraction, the exposed portion of the feather being coated with a transparent colorless layer of extreme thinness (8/1000 of an inch) which acts like a number of prisms in breaking up the rays of light. Thus, when a blue feather gets wet or when the bluebird is perched between one and the sun, it will appear only black or brownish.

Sometimes there is an excess of black pigment in the feathers of a bird which will make it appear much darker than the other members of the same species. This is called *melanism* and is better known in the familiar example of the black and gray squirrels, examples of both occurring in a single litter of young without reference to sex or vigor. The opposite of *melanism*, or *albinism*, is much more frequent and is caused simply by an absence or degeneration of pigment of all kinds. The not-infrequent white robins and sparrows or mottled birds with patches of white feathers are explained in this way and are due to inbreeding or some other weakness.

A MEADOW LARK AT ITS NEST

Showing the white outer tail feathers which are called "flash colors" and serve the bird in a protective way when pursued by hawks.

But to return to the gorgeous tanagers and the inconspicuous grouse, surely there is some reason for the difference in coloration which study might lead us to understand. We soon discover that brilliant color in almost every species is restricted wholly to the male bird and a moment's thought convinces us that the law of "The Survival of the Fittest" would soon weed out any bright-colored females should they arise, by drawing attention to their nests and inviting the destruction of their offspring. The very exceptions to the rule further substantiate it, for when bright colors are normal to the females, as in the kingfisher and red-headed woodpecker, nature protects the offspring by causing the eggs to be laid in holes in trees or tunnels in the bank where the female is entirely hidden from sight while incubating.

Another means of protecting conspicuously colored birds is by endowing them with extreme wariness and it

THE KING BIRD AT ITS NEST IN ORCHARD

The king bird is sometimes called "Bee Martin" because of its supposed habit of destroying honey bees. Investigations have shown that it catches but few bees and these mostly drones, and that it is a highly desirable bird because of the objectionable insects which it destroys and its habit of driving off crows and hawks.

is seldom that any one of them will allow as close an approach as do their dull-colored mates and relatives. They seem to realize that they are conspicuous and rely upon their alertness to escape. Moreover, is it not of direct benefit to the species that there should be a conspicuous decoy to lure away from the vicinity of the nest any enemy that should pass that way?—for even should the male be seen and captured, the offspring might still persist.

Brilliancy of plumage probably originates in every species through excess of strength and bodily vigor, and this fact undoubtedly tends to perpetuate and increase the brilliancy, whenever the bright colors are not directly disadvantageous to the species, by assuring to the brilliant, vigorous bird the best mate and strong offspring. Then it may well be asked why the males of all species are not conspicuously colored and able to rely upon their wits to escape their enemies. But think for a moment which are the brightly colored birds and which the dull. The tanagers, the trogons, the honey creepers, the tropical flycatchers, the buntings, the gulls, the terns, the herons and the flamingoes are all birds that spend their lives either in the tree tops or in the great open spaces where enemies cannot lurk. The nearer the ground a bird

A LEAST BITTERN ON ITS NEST—IN CATTAILS OF THE MARSH

An example of *mimicry* among birds—the shape of the bird in this posture, as well as the color, simulating its haunts, so that it is most difficult to see it among the cattails.

dwells and the denser the coverts, the nearer may an enemy approach and the more easily may it lie concealed. Thus it is clear why the gaudy tanager is confined to the tree tops and why the streaked sparrow must simulate its dry grass haunts if it would persist. Birds dwelling within reach of skulking enemies seldom wear brilliant colors or bear feathers that are continuously conspicuous. They are protectively colored and often fit in with their environment to such an extent as to be practically invisible. The ways in which this concealment is brought about are varied and interesting.

Concealing Coloration

There is one principle which underlies the coloration of all protectively marked birds which does more than anything else toward rendering them inconspicuous, and that is the principle of *counter-shading,* as it was named by its discoverer, the artist-naturalist Abbot Thayer. It had long been known by artists that to make objects appear solid and conspicuous on the canvas one must paint in their shadows, but it remained for Thayer to

apply the reverse of this practice and to point out that the way to make solid objects appear flat and inconspicuous was by painting out their shadows. He applied this principle to the coloration of animals and recognized that the protective coloration is brought about largely by animals being colored lightest on the throat and belly, which parts are thrown into the deepest shadow, and darkest on the head and back which receive the greatest light. Between the back and the belly there is a gradual change to the lighter, exactly counter-matching the amount of shadow, so that the solidity of the bird is "painted out," so to speak.

Photo by H. D. Reed

FIND THE SECOND BIRD MODEL

Two models were placed side by side on the gravel path. One was painted uniformly and the other was "counter-shaded" like a real bird. The "counter-shading" has rendered the second model almost invisible, and as only a very sharp eye can see it, it is perhaps well to explain that it is directly behind the plainly visible model.

This principle has been well illustrated by the celebrated bird artist, L. Agassiz Fuertes, with the two models here shown. Two blocks of wood were cut out in the general form of a bird and colored uniformly dark. He placed them out-of-doors on a gravel walk in good light and then with his brush proceeded to paint out the shadows on one of them by adding touches of white paint so as to just balance the shadows, with the result that this one eventually disappeared from view.

The principle of "counter-shading," like other great discoveries, is very simple. The human eye and probably all eyes judge the solidity of an object by the shadows which it casts, and an object which throws no shadows upon its underparts has no solidity. Through *counter-shading,* then, the bird appears flat and when it does so, it falls off into the background and becomes a part of it. If, in addition, its color pattern is similar to its haunts, it becomes practically invisible. And so we find the grouse and the woodcock, living on the forest floor, with a color pattern of spots and patches of light and dark brown; the sparrows and meadowlarks of the fields are streaked with buffy and rufous, like the dead grasses; the bittern of the marshes is striped like the shadows and lights of the cattails, and the sandpipers and plover are specked like the sand of the sea shore.

With insects this simulation of pattern is often carried to the extreme. There are butterflies and moths whose markings imitate exactly the dead leaf or the bark upon which they rest and even the shape of the wing is modified to make the simulation more complete. This scheme of Nature is called *mimicry.* With birds *mimicry* is much less perfect, but the screech owl, with its feathers drawn close and its ear tufts erect, certainly simulates very well a broken piece of bark. The night hawk, sitting lengthwise on the limb, looks like the broken stub of a branch and the least bittern in the marsh, with its bill pointing toward the zenith, the feathers of its long thin neck drawn tight, resembles a broken reed; so much so, in fact, that they will often remain on the nest in this posture until almost touched.

In the plumages of certain birds that are normally very difficult to see when at rest, we find a very different color pattern which seems at variance with all that has been said. Instead of there being a gradual transition from the dark to the light areas, there is a sudden abrupt change, often heightened by a black border. On the head of the wood duck, for example, the white of the throat extends up on the cheeks in the form of crescents. These, together with the white stripes through the crest and the black and white bars on the sides, would seem to make it most conspicuous. Similarly with the killdeer, its brown head is separated from its back by a conspicuous white ring and its snowy breast is crossed by two coal black bars. In spite of these marks, one finds that both the wood duck and killdeer in their natural environments are very inconspicuous, and we are led to believe that these *ruptive marks,* as they have been called, serve apparently to split up the bird into several pieces, destroy its continuity of form and thereby conceal it by making it unbirdlike.

FIND THE KILLDEER

The killdeer has some very conspicuous markings, but is difficult to see in its haunts because these "ruptive marks" break up its continuity and render it unbirdlike.

One other class of markings we might consider here since they are similar to the ruptive marks in being them-

selves extremely noticeable. I refer to the so-called "flash colors" or "banner marks." The white tail of the deer and the cottontail, which are raised and made as conspicuous as possible when the animal is fleeing; the white outer tail feathers of the junco; the white patches on the tail

THE DECEPTIVE WHITE AND BLACK

A close view of the killdeer at its nest, showing the "ruptive marks." The downy young crouching beneath the parent bird likewise has these marks.

of the meadowlark, and the white rump of the flicker, all fall in this class. These marks were at one time supposed to serve as signals to the young or to others of the species to keep the flock together, but Dr. C. H. Merriam has suggested that they may even better serve to give protection from their enemies. When the animal or the bird is fleeing, the eye of the enemy naturally fastens upon the very conspicuous flash color and when, suddenly, the meadowlark, for instance, drops into the grass, or the flicker claps up against the side of the tree, the banner mark suddenly disappears, but the eye, through the persistence of vision, follows on in the same direction in which the bird was going before realizing that it has stopped and, in the interval elapsing, the bird slinks off a few feet further or slips around to the other side of the tree and is nowhere to be seen.

So much then for concealing coloration among birds. Some authorities have claimed that all birds are protectively colored, and it is true that we as yet know too little of the struggles that go on between the birds and their enemies to interpret everything that we find in their

A WOOD PEWEE AT ITS NEST

Showing the broad, flat bill and the erect posture typical of members of the Flycatcher family. The shallow nest is covered with lichens to make it even more inconspicuous.

coloration and to find a use for everything that we see. It is here that the field naturalist and the woodsman by intelligent observation can help to interpret what at present seem like vagaries of Nature. That some birds are conspicuously colored there is no doubt in the minds of most of us. A crow on the snow or against the sky, or anywhere except in the coal hole, is bound to be visible from any angle. But the crow has been endowed with an intelligence and a wariness which need no concealing coloration to supplement them.

The problems of the differences in coloration between males and females and young of the same species, the changes from bright to dull colors and vice versa, we can better consider at another time.

The Classification of Birds

WITH this issue we begin a series of articles on North American Birds intended to supplement those of a general nature which will continue to appear. It would obviously be impossible to treat each of the nearly 800 species found in United States and Canada and we must, therefore, consider them by families, emphasizing and illustrating some one member of each. Before so doing, however, it may be well to say a word about what we mean by a "bird family" and explain briefly how birds are classified.

The classification of birds does not differ materially from the classification of other animals or of plants, and one familiar with any classification would find little difficulty in understanding the nomenclature of ornithology. All birds belong to the Class Aves, which is one of the five divisions of the *Phylum Chordata,* or backboned animals, the others being Pisces, or fishes, Reptilia, or reptiles, Amphibia, or frogs, toads and salamanders, and Mammalia, or mammals. The Phylum Chordata, together with others such as the Protozoa (one-celled animals), Cœlenterata (corals, etc.), Mollusca (clams, etc.), Hexapoda (insects) and others make up the Animal Kingdom. The Class Aves is usually divided into twenty-one Orders, seventeen of which are found in North America. Among

these are the Orders of Diving birds, of Shore birds, of Wading birds, of Waterfowl, of Perching birds, etc., and they are usually arranged serially to indicate their place in the scale of evolution, the Diving birds being the lowest and the Perching birds the highest.

The Order of Perching birds, or sparrow-like birds, contains nearly half of the known species of birds and has been divided into 65 families, 22 of which have representatives in United States and Canada. These we shall consider first, beginning with the family Tyrannidæ or New World Flycatchers.

The Flycatchers

The true flycatchers, or tyrant birds (family Tyrannidæ), are confined entirely to North and South America, where over 400 species occur. The European flycatchers belong to a very distinct family (Muscicapidæ) differing, among other ways, in being true singing birds, our American flycatchers lacking the vocal structures typical of true song birds. As a result, none of them have true songs, although many of them, like the kingbird, are noisy birds, and a few, like the wood pewee, have very sweet whistles.

The majority of the flycatchers live in the tropics, but among them are numbered some of our best known birds, including, in addition to the kingbird and pewee already mentioned, the phœbe, the crested flycatcher and the least flycatcher. They are mostly small dull-colored birds with typical flycatcher structure and habit. Their bills, for example, are broadly triangular, wider than high at the base and armed with stiff bristles at the corners, efficient structures for snapping passing insects from mid-air. They sit more erect than most birds, usually on some dead branch or other exposed perch from which they can survey the country and dart out after passing insects.

Their nesting habits show considerable variation. The phœbe builds a bulky affair of mud and moss on the cliff or under the bridge, the kingbird builds of roots and wool in the orchard, the crested flycatcher builds in a hole in a tree, and for some strange reason, invariably includes the cast skin of a snake, while the pewee, building a shallow compact affair saddled on a branch, always covers the outside with lichens to make the nest inconspicuous.

Many of the tropical flycatchers and some of the species of our own Southwest are showy birds and often have the broad bill or other parts specialized to a ridiculous extreme. The vermilion flycatcher is of a most brilliant red with darker wings and tail, and the scissors-tailed flycatcher is largely white with a light gray back and scarlet patches on the head and beneath the wings, and the outer tail feathers are greatly elongated, seven to ten inches in length.

All of the flycatchers are insectivorous and extremely beneficial birds. The kingbird has been said to destroy honey bees about apiaries, but investigations have shown that the few bees which it does eat are usually drones, and in all other respects he is an extremely useful bird. Particularly about the poultry yard is he a desirable tenant, for he is the self-appointed policeman of the district. No crow or hawk can approach without arousing his ire and being promptly driven off.

The pewee and the phœbe, and all the others, are invaluable allies, particularly because of the large number of moths which they destroy, the larvæ of which, like the cut-worm and the tent caterpillar, are potential armies of destruction against the agriculture and the forests of our country.

CROWS FEEDING

A crow, on the snow or against the sky or anywhere except in the coal hole, is conspicuous from any angle. But the crow has been endowed with an intelligence and a wariness which need no concealing coloration to supplement them.

Being so largely insectivorous, the species which inhabit Northern United States are naturally highly migratory, and with the failure of their food supply and the approach of winter, the phœbe is the only one which remains in the United States north of Southern Florida. The others cross the Gulf of Mexico or the Caribbean Sea to Central America and Northern South America.

ATLANTIC COAST NATIONAL PARK

PRESIDENT WILSON, at the instance of Secretary Lane of the Department of the Interior, has created by proclamation the Sieur de Monts National Monument on Mount Desert Island, Maine. By this act he enables the Department of the Interior to realize its long-time purpose to extend to the people in the east of the United States the benefits of the national parks service. This is the first national park east of the Mississippi River.

The new national playground is already known to many thousands for its majestic beauty. It embraces more than five thousand acres of rugged mountain, directly south of Bar Harbor. In fact, its northern boundary lies within a mile of that famous resort. On the east it touches the Schoonerhead Road. On its south it approaches within a mile of Seal Harbor. It lies less than a mile northeast of North East Harbor. It is surrounded, in short, by a large summer population.

Wild Black Currant | Smooth or Northern or Hawthorn Gooseberry | Skunk or Fetid Currant | Dog Currant or Prickly Gooseberry | Swamp Red Currant | Swamp Black Currant | Eastern Wild Gooseberry

DISTRIBUTION OF VARIOUS SPECIES OF CURRANTS AND GOOSEBERRIES IN NEW ENGLAND, ADJOINING STATES AND CANADA

The Alternate Hosts of the White Pine Blister Rust

By Lawrence R. Grose, M.F.

The white pine blister rust which threatens pines in Eastern States valued at $186,000,000 and in Western States at $240,000,000 is caused by a fungus. Wild and cultivated red currant and gooseberry bushes are essential to the spread of the disease. The easiest symptoms of the disease to detect are perhaps the irregular swellings in the bark which may appear at any time from a few months to six years after infection. In the spring the fruiting bodies of the parasite thrust themselves from within through the swollen bark and form whitish blisters as large as a child's finger-nail. After a few days the blisters break and disclose bright yellow dusty spores. These are blown about by the wind, but in order to perpetuate themselves must alight on the leaves of currants or gooseberries. A healthy pine cannot itself be infected directly by spores from another tree.

An examination of near-by currant and gooseberry bushes is therefore essential in ascertaining the extent of the disease. From June 1 till the time the leaves fall, the bushes should be searched for the mealy yellow masses which, hardly larger than a pinhead, may yet be so abundant as to cover a large part of the lower surface of the leaf. Later in the fall there are short hairy outgrowths. These also are on the lower surface of the leaf. If the symptoms are found, notify the State or the United States Department of Agriculture and take the advice which will be given. The disease has already appeared in Massachusetts, New Hampshire, Vermont, Connecticut, Maine, New York, Pennsylvania, Rhode Island, New Jersey, Wisconsin, Minnesota and parts of Canada. This article, describing red currants and gooseberries, will be useful in detecting the disease.

The Editor.

IN NEW ENGLAND, adjoining states and part of Canada, which are now feeling the attack of the white pine blister rust, there are several kinds of wild gooseberry and currant which the rust can adopt as alternate hosts in its curious dual life-history.

Perhaps the commonest of these is the dogberry, or prickly gooseberry (*Ribes cynosbati,* L.). This is a low, straggling shrub, two or three feet high, usually found growing in rocky woods, but thriving also in a variety of other places. Its leaves are simple and alternate, ordinarily occurring, except on the youngest shoots, in groups or bundles of three or four, arising from a common point on the stem. They are lobed and toothed, and somewhat suggest the maple type of leaf in outline, though more rounded, more blunt-toothed, and less deeply cleft. At the base of the leaf-clusters the stem is armed, in most cases, with spines, and the stem bears scattered bristles. The bell-shaped, greenish or dull purple flower is likewise armed with prickles, which remain about the fruit.

WILD BLACK CURRANT
(*One-half life size*)

Showing the fruiting spray and flower. This plant is common in wet woods and low grounds chiefly throughout New England and New York.

A frequent neighbor of the dogberry is the smooth, or hawthorn, or northern, gooseberry (*Ribes hirtellum,* Michx. = *R. oxyacanthoides,* L.). It is not quite so widely distributed as the dogberry, but it is not hard to find, if one looks in wet woods and on low grounds, where it prefers to live. In habit it is a small spreading shrub

SKUNK CURRANT
(*One-half life size*)

The fruiting spray and flower. This is frequent on cool, moist, rocky hill-slopes and mountainsides, chiefly in New York and western and northern New England.

SMOOTH WILD GOOSEBERRY
(*One-half life size*)
Showing the fruiting spray and flower. This occurs in all sections of New England and New York in wet woods and low grounds.

much like the dogberry, from which it differs mainly in bearing fewer spines on the stem and none at all on the fruit, and in having a smaller leaf with a sharper, wedge-shaped base. Average leaves are here referred to, for in each species of the currant-gooseberry family the leaves vary considerably in general outline and in the shape of the teeth, and are not very definite marks of distinction unless a good many are taken as the basis for an average contour.

Along roadsides, and in thickets and open woods near dwellings, there may sometimes be found garden gooseberries thriving in the wild state. These are enough like our native ones to be confused with them by the inexpert. Nevertheless, no attempt will be made here to name the points of distinction, since any one familiar with the native species will recognize the garden varieties, and that is, for the present purpose, sufficient. Aside from the two species described above, no native gooseberries occur commonly in western Massachusetts.

PRICKLY WILD GOOSEBERRY
(*One-half life size*)
Showing the fruiting spray and flower. This is very common in New York and northern and western New England, chiefly in rocky woods.

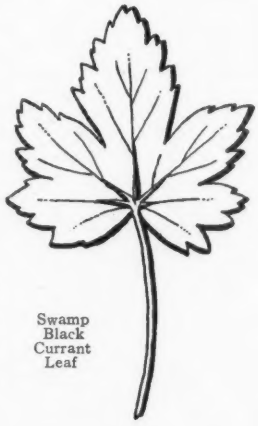
The blister rust, however, takes as readily to currants as to gooseberries. The commonest of these is the skunk or fetid currant (*Ribes prostratum,* L'Her. = *R. glandulosum,* Grauer), so-called because of the unmistakable odor of its stems, roots, and fruit. It flourishes on cool, moist, rocky hill-slopes and mountain-sides. In habit it is recumbent, with spineless stems that run along under the leaves, and send up frequent shoots. Its leaves, as in the case of all members of the *Ribes* genus, are alternate and usually in bundles. They strongly suggest the maple shape. The flowers and the fruits of skunk currant, as of all currants, grow in racemes or long clusters with a central stem to which the individual flowers or berries are attached by short stems. It will be noted in the illustrations that the fruits of the gooseberries occur commonly in twos and not in clusters. The flowers of the skunk currant are small, greenish, and bell-shaped;

Eastern Wild Gooseberry Leaf

Smooth or Hawthorn or Northern Gooseberry Leaf

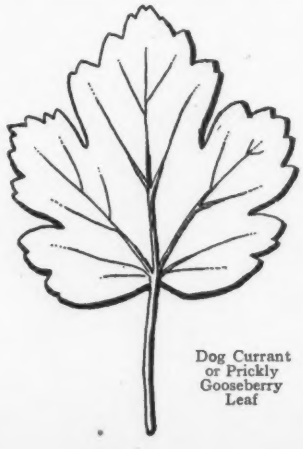
the fruits are a pale red, and they are covered with soft bristles. In winter, this plant is the one conspicuous member of its genus, because of its handsome red buds.

Another common currant is the wild black currant, *Ribes americanum,* Mill (= *R. floridum,* L'Her.), which closely resembles the black currant of gardens. Its leaves are distinctly maple-like, with a large and elongated central lobe; and they are dotted with resin spots. The clusters of skunk currant are comparatively erect; those of wild black currant are markedly drooping. The flowers are pale green, yellow, or white, the fruits black and smooth. This currant prefers non-rocky sites and rich soils near streams.



Swamp Black Currant Leaf

In addition to the skunk and black currants, there may be found in limited parts of the region under consideration the swamp red and the swamp black currant (*Ribes triste,* Pall., and *R. lacustre,* Poir.). Both grow in swamps, in the coldest and wettest woods, and in sub-Alpine sites, high grounds which have in their influence on plant life a likeness to cold and swampy lowlands. Both also are northerly plants, and in Massachusetts are not far from their southernmost extension. The swamp red currant has large and conspicuous yellow-green flowers and smooth red berries. The stems are straggling or reclined and from three to five feet long. In all respects this currant is very like the garden red currant. The swamp black currant, *Ribes*



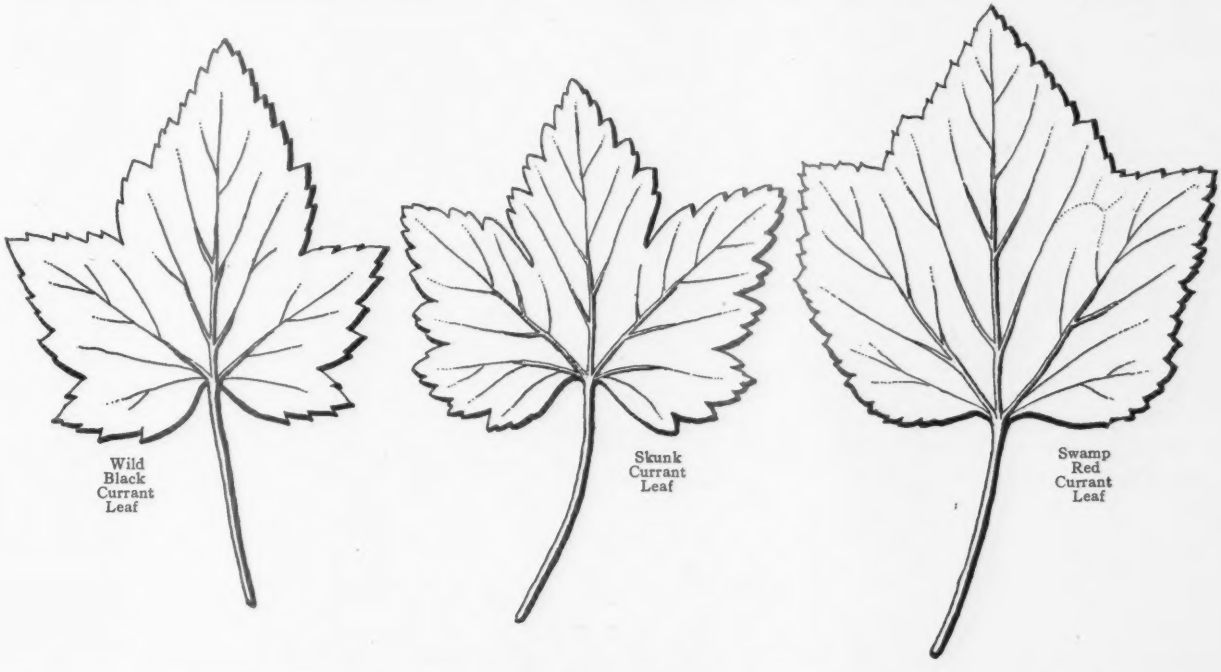
Dog Currant or Prickly Gooseberry Leaf

lacustre, has deeply-cut five-lobed leaves, greenish flowers in clusters, dark purple bristly fruit and a prickly stem. In the grouping of its characters it is obviously peculiar among its kind, with the clusters of a currant and the prickliness of a gooseberry; and rival botanists leave us the choice of calling it by either name.

Garden currants, like garden gooseberries, frequently escape to roadsides, thickets, and open woods. They may be confused with native kinds, but not easily with plants of any other genus. Taken separately, the leaves of some hawthorns, of nine-bark, of maple-leaved viburnum and high-bush cranberry might suggest their leaves, but the recollection that their habit is low, straggling, or recumbent, and that their leaves are alternate and, save on young shoots, typically in bundles, will serve to keep this genus distinct from others. Ordinarily, currants and gooseberries bloom in May and June and form fruit in July and August. Species preferring comparatively warm sites may bloom in April.

Given a foothold, the blister rust will find means of spreading in any region. The accompanying maps indicate the range of the various currant-gooseberry species in the rest of New England and states immediately to the west. All the species common in the Berkshires are common also in New York, Vermont, New Hampshire, and Maine; New York has an additional species, the round-leaved or Eastern wild gooseberry (*R. rotundifolium,* Michx.), said by some to cross the Massachusetts line; and the northern New England states have the skunk, swamp red, and swamp black currants in even greater abundance than has Massachusetts. There are quantities of smooth gooseberry and wild black currant in eastern Massachusetts, and some of both of these, along with dogberry, in the parts of Connecticut in which much pine grows. The occurrence of all of these species is not as continuous as the maps, owing to their smallness, must suggest; but wherever within the shaded areas the favorable sites exist, they are almost certain to be.

Furthermore, nearly all the New England and New York species have ranges extending far to the north and west, swamp red currant, swamp black currant and skunk currant running clear to the Pacific, and wild black currant, dog currant, or prickly gooseberry, and smooth, hawthorn or northern gooseberry growing throughout the Great Lakes region and well beyond the Mississippi. To the west and north there also occur several other native species. The currants and gooseberries are common in nearly all parts of the north temperate zone; and out of a total of one hundred and twenty species and sub-species, seventy occur in the United States. In whatever part of our country the five-needle pines exist, some one of the currants or gooseberries will be found not far away.



NOMINATE FRIENDS FOR MEMBERSHIP

The Association wishes to add Five Thousand Members to its list before the end of this year.

To do this it must have assistance from its present members. If they will kindly send to the office names of friends they wish nominated, these friends will be sent sample copies and descriptive circulars.

These names should be sent in at once.

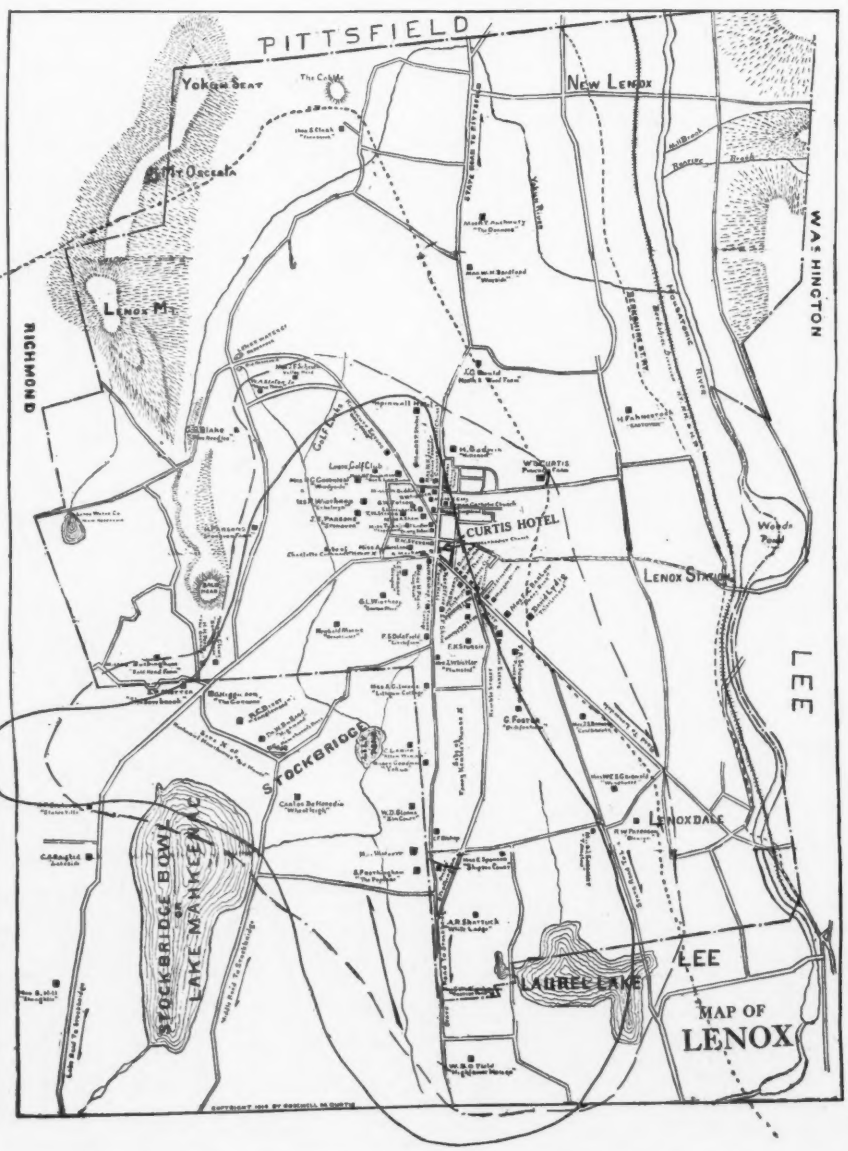
See the Premium Offer on Table of Contents page.

White Pines of Lenox Menaced

REPORTS of the general prevalence of white pine blister rust in the vicinity of Lenox, Massachusetts, have aroused deep concern for the safety of the white pine trees that contribute so largely to the notable beauty of this aristocratic centre of the Berkshires. During May and June of this year, many infected white pines of all sizes and ages were found in this region. The limits of the area of infected pines are represented in the accompanying sketch by the solid heavy line. Small trees were destroyed, and the diseased branches of larger trees were cut and burned. Since some of these trees had diseased branches, 60 or 70 feet above the ground, this was not an easy task. Late in May the early summer stage of the blister rust began to appear on the leaves of currants and gooseberries, and before the end of June, the late summer form (the stage which, in the fall, infects neighboring white pine trees) was found.

The territory in which currants and gooseberries are now infected with the blister rust is outlined on the map by the heavy dotted line. Scouting for the blister rust is being done by a force of men working under a coöperative agreement between the Massachusetts State Nursery Inspection Service and the United States Department of Agriculture. Under the authority of the Massachusetts law, the diseased currants and gooseberries are being eradicated by State employees as rapidly as possible. The area in which affected bushes have been removed is shown on the sketch by the broken line. The magnitude of this work lies chiefly in the time and labor necessary to locate and exterminate the wild currants and gooseberries that grow in the woods by thousands.

Conditions last spring in an infected area near Ipswich, Mass., have demonstrated that there is no hope for white pine trees that have been long exposed to the spores, blister rust maturing on nearby currant and gooseberry bushes.



MAP OF LENOX, MASS., SHOWING AREA OF WHITE PINE BLISTER RUST

——— Boundary of area of pines infected with white pine blister rust.
- - - - - - - - Boundary of area of currants and gooseberries infected with white pine blister rust.
—·—·—·— Boundary of area from which diseased currants, gooseberries and pines have been removed.

For the first two or three years after a white pine tree is infected with this fungus, the presence of the disease may not be apparent, but its effects are just as deadly as the action of chestnut blight on chestnut trees.

Many noted writers have extolled the charms of the trees of Lenox. Henry Ward Beecher admired them and in his "Star Papers" writes: "Our first excursion in Lenox was one of salutation to our notable trees. We had a nervous anxiety to see that the ax had not hewn,

nor the lightning struck them; that no worm had gnawed at the root, or cattle at the trunk; that their branches were not broken, nor their leaves falling from drouth. We found them all standing in their uprightness. They lifted up their heads toward heaven, and sent down to us from all their boughs a leafy whisper of recognition and affection. Blessed be the dew that cools their evening leaves, and the rains that quench their daily thirst! May the storm be as merciful to them when, in winter, it roars through their branches, as is a harper to his harp! Let the snow lie lightly on their boughs, and long hence be the summer that shall find no leaves to clothe these nobles of the pasture!"

The "Hawthorne Pines" stand sentry over the site of the "little red house" where Nathaniel Hawthorne wrote "The House of the Seven Gables" and "The Wonder Book." Fortunately, these pines have not yet shown signs of being attacked by the blister rust, although they are within the limits of the area where diseased trees have been found. It would be interesting to read what Beecher, Hawthorne, Catherine Sedgwick, Oliver Wendell Holmes, James Russell Lowell, Edwin P. Whipple, J. T. Headley, J. T. Fields, and the other masters of words, who once lived in the vicinity of Lenox, would have written had the white pine been menaced in their day as it is now. To them the trees of the Berkshire Hills were delightful, loved friends, and one can imagine them exerting their pens to the mightiest efforts in pleas for concerted action in warding off the devastation that threatens.

$3,000,000 FOR NEW ENGLAND AND APPALACHIAN FORESTS

AN APPROPRIATION of $3,000,000 for continuing the purchase of forested lands at the head-waters of navigable streams in New England and the Southern Appalachians is assured for the next two years. The amendment to the Agricultural Appropriation Bill, providing for this money, $1,000,000 for the present fiscal year and $2,000,000 for the next, passed the House on Friday, August 4, and will become a law as soon as it is signed by the President.

Thus ends, successfully, a long continued effort by the American Forestry Association, its members, and a large number of actively coöperating organizations, to have Congress provide for the continuation, under the provisions of the Weeks Law, of this work, which has been so ably done during the last several years by the Forest Service.

The various stages of this campaign have been described in previous issues of AMERICAN FORESTRY. First, in the summer of 1915, the American Forestry Association decided to devote itself to the effort to have an appropriation bill passed. A meeting was held at Washington, D. C., of officers, members of the Association, and representatives of coöperating organizations, and a plan of work decided upon. On September 23 a memorial urging the appropriation was presented to Secretary of Agriculture Houston. Then followed the task of keeping the public and members of Congress informed of the necessity for the appropriation, of enlisting the aid of Boards of Trades, Chambers of Commerce and other bodies.

On January 28 of this year there was a special hearing before the Agricultural Committee of the House on the measure and powerful arguments favoring it were presented. Later, however, this committee, by a vote of 8 to 7, decided not to include the appropriation in the Agricultural Appropriation Bill and it was not in it when the bill passed the House. This was a big disappointment and a serious set-back. However, Senator Gallinger of New Hampshire consented to introduce in the Senate an amendment to the bill, and the Appalachian measure, as it has been generally called, was given new life. The Senate adopted the amendment. It went back to the House with the Agricultural Bill. The House refused to concur in the Senate amendments, and sent the bill back. The Senate changed some amendments, but did not alter the Appalachian one, and all went back to the House. The American Forestry Association thereupon sent letters to members in town and telegrams to those out of town asking them to be present when the vote was taken.

In the meantime, Chairman Lever of the House Agricultural Committee, and other representatives and senators in favor of the amendment, had urged upon members of the House the desirability of continuing the work and the necessity for the appropriation in order to do so, and finally when the bill came up on August 4 the amendment passed.

The American Forestry Association wishes to express its appreciation of the aid given by coöperating organizations, by interested bodies and by individuals in all that was done to secure this appropriation. There will now be added to the forested lands already secured by the Government in the New England and the Southern Appalachian regions a considerable area of very great value in protecting the head-waters of streams and in providing for forests in the future in a number of states where the forests have been seriously depleted and where new forests are a vital necessity.

During the few years that money has been available for this purchase, the work has been done by the Forest Service in a highly efficient manner. Lands have been acquired at low prices in areas where such holdings will be of the greatest public service, and the whole area purchased has been included in the Appalachian National Forest, of which Wm. L. Hall, who has had charge of the work since its inception, is the district forester.

Forestry for Boys and Girls

by Bristow Adams

About Swimmin' Holes and Such

"YOU put the boys in last time," said the older girl, "and it seems to me that girls ought to be in. You know it is 'forestry for boys and girls.'"

"Yes; but that was about fishing. And you don't care so much about fishing as they do."

"But we care about the trees and the water just as much as they do. And we use the water more than they do."

She had me there. When I thought of all the times—indeed before every meal—that the boys had to be strongly reminded that water was needed on their grimy paws ere they could come to the table, I had to give up. Even then the older girl pressed her advantage, and the younger, also, chimed in:

"Besides, we can swim all over the pool under the big waterfall, and the boys can't. The water means more to us than it does to them. So you've got to give the girls a chance."

"But, you must remember, I'm not supposed to tell things about boys and girls—only about trees and forests."

"Then," said the younger, with a gleam of triumph, "what did you say anything about the boys for last time?"

"That," I replied feebly, "was to add Human Interest."

"Well, aren't we Human Interest?" chimed in both girls at once.

So, of course, I had to let them have their way, and to own that even the poets say "there isn't any story till the girl comes in!" Then they proceeded to dictate what I had to say, following up their victory. It was about like this:

"Tell those other boys and girls that we believe in trees, and that we know that we would not have any swimming holes if it were not for the forests."

INDEED it is true. In our own creek, which flows so clear all summer long, there might be holes under the waterfalls, but if there were no trees along the upper part of the stream, there would be a heavy run-off after each rain, with mud to fill up the stream-bed, and to make the bottom slimy and slippery. Then, when the hot weather comes, and only a little rain, the stream would stop flowing, and what few pools were left would be stagnant and warm, and covered with green scum, instead of being cool and clear and fresh.

But it isn't only the swimming and the fishing that suffer from a lack of forests and a resulting bad effect on the streams. Think of all the other uses of water! Not counting the water which acts on mill wheels and grinds grain, or runs sawmills, or even makes electricity to light cities, to move electric cars, to heat buildings, to turn machinery, to bake biscuits, and to do all sorts of other things! Not counting rivers and canals for the passage of boats! But just think how we need water in our houses, for drinking and for washing ourselves and our dishes, our floors, and our clothes! Wouldn't we be in a bad way if we didn't have fresh, pure, clear, clean water?

TO be sure of such water we need the forests. In the West, not less than twelve hundred towns and cities get their water supplies from the tree-covered slopes of the National Forests. In the East, many of our cities, like Boston, have their forests to protect and to keep steady and pure the city's supply of water.

Then, if we cut off our forests will we

have less water? We may not have any less falling from the sky, but there would be a lot less of the kind of water we wanted, when we wanted it.

Indeed, some folks say that the cutting down of the trees in certain parts of the country has cut down the water supply at the same time. They say that the earlier homes in the northeastern parts of this country were built near convenient springs. In the course of time, with forests cleared away to make room for fields, these springs dried up. Then shallow wells were dug, and these, too, failed, and had to be drilled or dug deeper.

OUR water supply is of two parts: that constantly in use on the surface, in the shape of rain, fog, snow, and dew; and that which is stored in the ground. Usually there is not enough of either kind alone for all of man's needs—to grow his crops and to do other work for him. Each part helps the other out, and the part which has been adding up in the ground in years of much rain helps out the surface supply in years of little rain. Of course, the forests form an important part of these reservoirs.

Measurements taken in wells in ten states show that in about half of the wells measured the water level had dropped. This is due, it is thought, to more demands on the water to grow our grains, to furnish drink for man and animals, and to serve many needs which did not exist when the wells were first dug. But only a third of the water loss can be accounted for in these new demands. The greater part of the loss of the rest has been due to the cutting away of the forests where they could and should have been left.

The trees were not there to check the storms and snows and to hold them until their waters sank into the ground. The spongy leaf litter in the woods was burned away, gullies were formed and drained out the water that ought to have remained under the ground. One of the remedies for this is to keep the forests growing on the hillsides, at the heads of the streams.

THEN will we always have 'swimmin' holes'?" asked the older girl.

"Then you will always have 'swimmin' holes,'" I replied. "And if the trees are kept growing, and the streams are kept running, even the two littlest boys who haven't yet learned how to swim, will be able to come back when they are grown-ups, and find the old swimming hole again. Unless"—and I think of one swimming hole I used to know—"unless some big city has reached out and covered over the old swimming hole, and turned it into a sewer."

THE swimming hole used by my own children is better than any I ever knew. My first was in a little country "run." With a deal of labor I dammed it to make a waist-deep pool. Here I learned to swim. What a thrill in the discovery that one can actually keep up without even a toe on the bottom! Life holds few such triumphant moments.

Then there was a larger creek where we went in above a big dam, in great fear of being swirled down the mill-race.

Darting dragon-flies, or "devil's darning needles," gave another risk, "cause they sew your shoulder-blades together—sure indeed they do! Oncet they was a feller 'at had his'n sewed together thataway, an' he never did get right. 'Course the doctor unsewed him, but he was always kind o' stiff-necked and humped-up-like, afterwards."

No one really believed this, but it was part of our game of make-believe, and added zest to life.

And these fancies prevail to-day. Who started the sign of two up-held fingers to mean "goin' swimmin'?" I'll bet that Pharaoh used it on the banks of the Nile!

Sometimes, when we see again the swimming holes of youth they seem to be shrunken away, because that's a way with youthful joys. But very often, we find that, because the trees have been cut down, the streams are smaller, and the pool that cost many a struggle when we were first swimming it, can now be straddled with one step.

Southern Floods and Their Forestry Lessons

By Herman H. Chapman

Professor of Forestry, Yale University

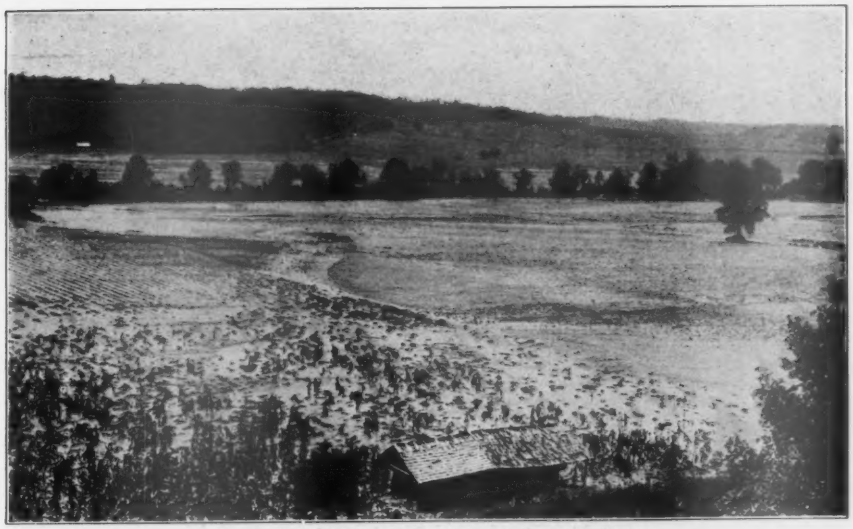
ON SATURDAY night, July 15th, after a day of rain, a continuous downpour set in covering the mountainous region of Western North Carolina. By morning from 10 to 15 inches of water had fallen, as measured by the records of the Weather Bureau. Upon the Catawba river, whose sources lie in the Blue Ridge east of Mt. Mitchell, a flood started which swept with increasing velocity and destructiveness through the entire length of the river to the sea, carrying with it, with one or two exceptions, every railroad and turnpike bridge on the stream, no matter how substantially built or anchored. Similar floods occurred on other rivers flowing both east and west from these mountain chains.

VIEWS OF LANDSLIDES

The photograph on the right shows where the big landslide has washed across the course of a stream, completely blocking it. The second shows at close hand a part, and only a small part, of the devastation in the path of a landslide.

Accompanying these floods, great landslides, or mud avalanches, occurred on the steep mountain slopes, tearing gashes thousands of feet long and from 50 to 300 feet wide in the forest cover, and precipitating the débris on roads, railroads and into streams, where it was whirled away in the mad torrent to be deposited on fertile fields of corn in drifts two to eight feet deep. Swelled beyond all previous experience, these raging floods viciously gnawed into their banks. Protecting belts of trees were uprooted and whole fields, 30 to 100 acres in extent, melted into the current and were borne away, leaving a waste of boulders in place of soil worth $200 an acre. The extent and suddenness of the damage were almost incredible, and unless one had seen conditions as they were before this flood, he would not believe that the transformation and ruin were the result of about twelve hours of high water. The death-list of over eighty persons was kept down only by the fact that most mountaineers build their homes on high ground, and have had some experience with floods. Many had narrow escapes. Rising waters warned most families early in the evening. At the head of Clear Creek, from which the town of Marion, in McDowell County, gets its water supply, the family of James Turner, a mountain patriarch, took refuge at midnight in a small outbuilding to escape the encroaching flood, which was whirling down trees and logs on its crest. At the instant when they had gained this shelter an enormous landslide started on the mountain directly opposite, tore its way down, completely filling and crossing a small ravine, causing the earth to tremble and plunged into the stream, sending a great wave up the bank, which, had it been a few seconds sooner, would have engulfed the refugees. Violent air currents were caused by this slide which threw the children about, but no one was injured. They then fled up the slope and passed the night in the woods without shelter, listening to the boulders grinding together in the flood as it swept away every vestige of their cornfield in the bottom. Mr. Turner, 76 years old and suffering from a malignant cancer, had been bedridden for months previous to this experience, but the shock and excitement restored his strength, and he was up and about, able to talk of the events of the night with gusto.

George Bird, forest ranger, whose house was on the flat, 100 feet from the old brook channel, became aware early in the evening that the stream was destroying his front yard and eating its way towards the house. He frantically emptied the structure of its furniture and children, and awaited the moment when it would disappear down stream. But the flood spent itself just



FLOODED CORNFIELD ON CATAWBA BOTTOM

The flood swept over this as it did over hundreds of other productive cornfields, destroying them by burying them in sand. The corn was in tassel and there is no possibility of a second crop.

before the stone chimney was undermined, and left the house overhanging the bank, whence it could be rescued and relocated on higher ground.

Bob Willett, farther down the stream, found in the morning that a new boulder-strewn channel, 150 feet wide, separated his house from his barn, which still stood intact on an island newly formed by the destruction of his best bottom land.

On the Catawba river, the farm of George Carson was almost completely carried away. This was in part due to the cutting of a thick grove of timber on an island lying directly above the farm owing to the desire of renters to bring more land under cultivation. Lacking this dense protecting belt, the current first gutted and destroyed the entire island and then swept right on across the old stream channel and took the Carson farm with it. At least 50 acres of bottom land were ruined. Carson's horses and cattle were abandoned to their fates, tied in the barn, but waters, which rose to a height of five feet, receded, and they escaped drowning. Two small colts even managed to survive by climbing into the mangers. Near the C. C. and O. Railroad bridge, a tenant farmer, with his wife and two small boys,

C. C. AND O. R. R. BRIDGE DEMOLISHED

This bridge, south of Sevier, and thirty-five feet high, was swept away by a flood which was twenty-five feet higher than the water level shown in the photograph.

A WAGON BRIDGE, CATAWBA RIVER

Both the approaches to this bridge were destroyed by the flood, but the span was probably saved by the white oak which fell against it from the lower side, bracing it against the flood.

was seen gazing ruefully at the once fertile land, now a mass of boulders and mud. He said: "This don't look much like bread!" One refugee reached Marion bearing on his shoulders a sycamore limb. He explained that he had sat on that limb from Saturday evening until Sunday afternoon to escape being drowned—so he sawed it off as a memento.

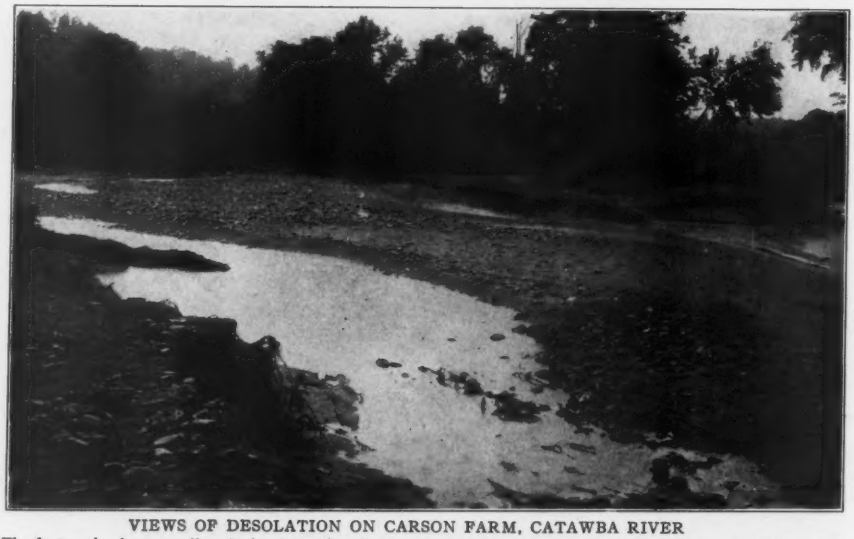
A trip to the top of Mt. Mackey showed that the floods had their origin on the steep slopes of the higher ridges. The greatest damage was done by the crests which swept away the bridges, and by the enormous

amount of silt and wreckage carried by the stream, scouring and burying the bottoms. The steeper the slopes, the greater the per cent of rainfall which will normally run off instead of being absorbed by the soil. Thin soil, rock and bare or grassy ground adds to this tendency. The heads of the streams lie in deep pockets, where walls or slopes extend in a half circle about them and form a funnel, concentrating the run-off suddenly in the stream. On the extreme upper slopes, no flood effects were seen, but with this concentration, the lower slopes soon began to show the effects. In many places sheets of water had flowed down over the hillsides, carrying the leaves, dead trees and other natural obstacles into the stream-bed. Suddenly checked and swollen, the stream proceeded to burst these dams, and, piling up great mounds of detritus against every obstacle, it cut its way through with irresistible force. Meeting other flood crests emerging from contiguous valleys, the flood tore on to swell the main current of the Catawba, and complete the work of ruin. The effect was like the bursting of a dam, and in places small dams did go out, increasing the maximum height of the flood.

What is to prevent such calamities? When rainfall occurs of such tremendous magnitude in so short a time, floods are going to follow, and may again, as in this instance, overleap all obstructions. But in spite of this fact, the enormous retarding effect of the forest cover on the velocity of the run-off, especially on steep slopes, was strikingly evident. The possible effect, had these slopes been bare of trees, staggers the imagination. Unfortunately, forest fires have, until very recently, devastated the dried upper slopes to great extent, and have been prevented from completing the destruction

WHERE GOOD FARMING LAND WAS WASHED AWAY

FARM FLOODED AND FIELDS COVERED WITH MUD



VIEWS OF DESOLATION ON CARSON FARM, CATAWBA RIVER

The destruction here was directly due to cutting timber on an island up-stream, just above the farm. The flood tore out this island and carried the old stream channel at right angles, tearing out a protecting belt of river birches. Entire fields were swept away to bed-rock, the torrent of water removing soil to the depth of from three to ten feet. It is claimed the river birches, when up-turned, really aid in destroying the bank, while a reed bank is not apt to wash.

of the lower slopes only by their greater moisture and shade. These burned areas, devoid of vegetable humus, of decaying logs and other natural obstructions, presented practically no obstacle to the immediate precipitation of the foot or more of water falling upon them, in an overwhelming deluge upon the better protected slopes beneath, ruining these natural defenses of leaf litter, logs and brush, overwhelming them as, in an irresistible charge, the trenches of an enemy are demolished.

IRON GIRDERS CARRIED AWAY BY FLOOD

The force of the rushing waters was so great that these heavy iron girders were washed two hundred and fifty feet down the bank of the north branch of the Catawba River from a bridge which was overthrown.

Had fire protection, extending through a period of two or three decades, restored the spongy soil cover to these high slopes, which is so characteristic of northern spruce forests, the furious rush of water into the streams would have been retarded and the flow distributed. Even if eventually just as much water had escaped from the soil into the streams, the high flood crests would have been reduced, less sediment carried, less land washed away and the damage greatly reduced. None can prove that the forest cover on these mountains has any permanent effect either upon the amount or distribution of rainfall, but he would be blind indeed who could study the conditions on the ground and fail to realize that the forest cover, protected from fire, is the only means of saving the river valleys from utter destruction. That this destruction occurred was in spite of the forest and because of its neglected condition. The entire episode forms a striking argument for the rapid completion of the purchase by the National Government of as much land as possible in these high mountains and the establishment of rigid fire protection thereon.

THE NEW LOUISIANA FORESTRY LAW

THE full text of this forestry amendment to the Conservation Law of Louisiana was received too late for publication in our last issue. It reads as follows:

"Sec. 8. That one-fifth of all licenses herein collected from the severance of timber and turpentine shall be accredited to the forestry department of the Department of Conservation and shall be expended upon the warrant of the Commissioner of Conservation in the execution of the forestry laws and for such purposes only; provided that such forestry department under the general direction of the Commissioner of Conservation shall be superintended by a technically trained forester of not less than two years' experience in professional forestry work; provided, further, that no expenditure proposed hereinunder in executing said forestry laws by said Commissioner of Conservation shall be made except on the approval of a general forestry Advisory Board which is hereby created and which shall consist of four members to be appointed by the governor, and of the Commissioner of Conservation, who shall be ex-officio member and chairman. Said membership shall be chosen, two from well-known timber owners, one from farmland owners interested in farmland reforestation, and the Professor of Forestry in the State University. The said Forestry Advisory Board shall meet quarterly at the domicile of the Conservation Commission, and not oftener except upon the call of the chairman, and shall have no salary compensation or per diem, but shall have actual traveling expenses for attendance upon such meetings."

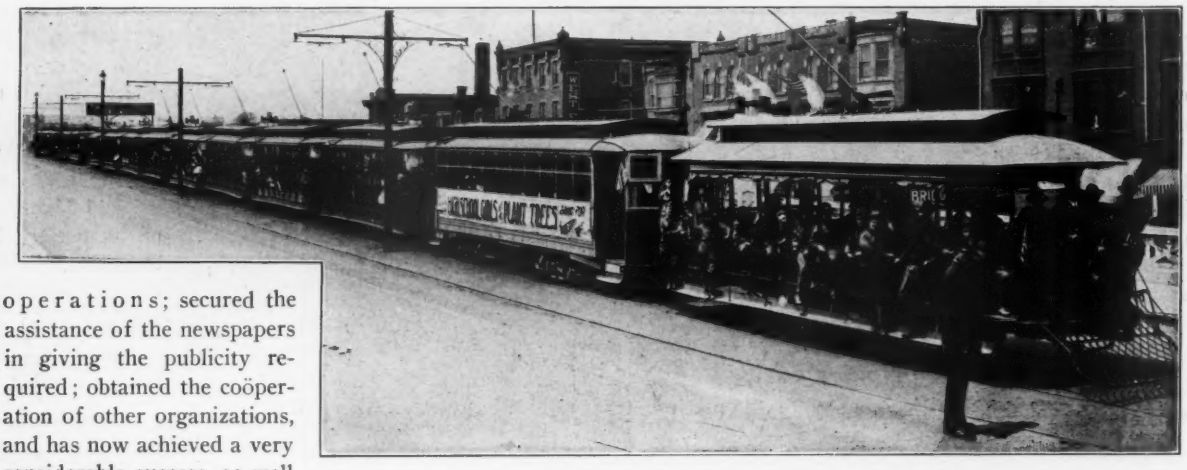
It is estimated that the revenue from the license tax on timber and turpentine alone, under the new law, should approximate $100,000 annually, which would make available about $20,000 for the work of the state forester.

AMERICAN FORESTRY called attention to the need for this amendment of the Louisiana Law and reorganization of the work, in an editorial published in May of this year. The immediate response of public sentiment and securing of the law is a striking proof of the fact that Louisiana was in reality well abreast of the times in general knowledge of and interest in forestry, and ready to take this great forward step, which means so much to the entire movement in the South.

HAVE YOU NOMINATED ONE OF YOUR FRIENDS FOR MEMBERSHIP?
WHY NOT DO IT—NOW WHILE THIS REMINDS YOU?

An Example in Conservation Work

THE Berks County Conservation Association of Pennsylvania is one of the most striking examples in the United States of what may be done for conservation by the right kind of local organization. Organized in September, 1914, it found facing it the problem of conserving the forests and trees of the county, the water-sheds and water courses, bird life and places of scenic value. Blessed with energetic officers, it speedily extended its membership, aroused the interest of all the people of the county in its work; enlisted the aid of the school teachers and the school children in its tree-planting operations; secured the assistance of the newspapers in giving the publicity required; obtained the coöperation of other organizations, and has now achieved a very considerable success, as well as established the conservation movement in the county so strongly that it will not die. At the same time the Association, by its endeavors and by the particularly good results obtained, has set an example to other organizations and has encouraged the growth of a number of them along similar lines of work.



THE REGIMENT OF PLANTERS EN ROUTE

Fifteen street cars were required to transport the Boy Scouts and school girls of Reading, Pennsylvania, who enlisted at the call of the Berks County Conservation Association, to plant several thousand trees on the water-shed of the company which supplies the city with water.

What it has accomplished is well described by Harvey F. Heinly, an attorney of Reading, Penna., and an enthusiastic member of the Association. He says:

"In the fall of 1914, we planted 3000 pines on Mount Penn; maintained a Forest Fire Patrol of 14 men and 6 State Policemen during the dangerous forest fire season. Large placards, cautioning the people of the dangers and losses from forest fires, were posted all over the county, and an educational campaign, through the newspapers and in the public schools, was inaugurated. Forest Fire Wardens were appointed by the State Forestry Department at our request and are still in service. The Association tabulated the forest lands of Berks County, and we know now where every acre is and who the owner of it is; and in order to encourage proper reforestation the Association went so far as to find customers for those who have made up their minds to market their timber in a proper and scientific way.

"During the year 1915, 2000 small pines were planted at the Bethany Orphans' Asylum by the children themselves; 1000 small pines were planted at the Topton

THE REGIMENT OF TREE PLANTERS

The enthusiastic force of school children, gathered by Reading to plant trees, assembled for action on the land which they were about to plant.

HOW TO PLANT

A squad of the Reading tree planting force being instructed by the forester how to place the pines in the ground.

A PLANTING SQUAD AT WORK

After instruction by the forester, these girls went to work and not only planted a quantity of trees but did the work skilfully.

Orphans' Asylum, at Topton, by the orphans. At the suggestion of the Association, a municipal nursery was started at Lake Antietam, where there now are 30,000 seedling trees furnished by the State; 8000 pines were planted on the Antietam Watershed by 430 school girls; 7000 pines and spruces were planted on Mount Penn by 125 high school boys; 3000 pines were planted on the water-shed of the municipal water-works at Fleetwood; thousands of pines were planted by individuals.

THE PLANTING SQUAD

After the boys had dug the holes for the seedlings, the planting squads of girls followed and planted the pine seedlings quickly and well. The character of the work is excellently shown by the photograph.

"Travel trails were laid out to all points of interest in Berks County, to be marked by flying birds and a book called a Blue Book. At the instance of the Association, a Volunteer Forest Fire Patrol was organized among the school boys, boys' clubs and Boy Scouts, for the purpose of educating them in fire prevention and forest fire fighting. A press campaign was organized for fire prevention through the public and the schools of the county; and the Association had educational exhibits at the Reading Fair, Pure Food Exhibit and Electrical Show on the subject of conservation and fire prevention.

PREPARING FOR THE PLANTING

Before the regiment of tree planters arrived, squads of men cleared the ground, burned the brush dug holes and put the water-shed in condition for the invasion of the conservationists.

"During the year 1916, up to the present time, we started a permanent office and elected as secretary, Mr. Solan L. Parkes. We started a campaign in the beginning of the year for further forest planting, and requests for one-half a million trees were received from every township in the county. The State Forestry Department furnished these. A million trees were planted in April and May of this year; 10,000 were planted on Reading City property, its water-sheds and its mountain property, by 220 boys and 770 girls of the high schools; 25,000 were planted at the State Insane Asylum, South Mountain, by the inmates of that institution; 10,000 more were planted by the orphans at Bethany Orphans' Asylum at Womelsdorf; 10,000 by the orphans at the Topton Orphans' Asylum, at Topton; 21,000 were planted by James A. Schofer, at his place on State Hill; 20,000 more were planted by the Borough of Fleetwood by the school children; 5000 were planted by County Controller Rhode; 6000 by W. E. Sharman, a lawyer near Fritztown; 6000 by Sherman H. Hoverter, another lawyer, in Alsace Township; 26,000 by another lawyer, Herbert R. Green, on the slope of Neversink Mountain; 45,000 by Jacob Nolde on his property in Cumru Township; and 17,000 were planted on the Horst tract.

"At the instance of the Association, the Reading School District employed an expert to trim all the trees on the Reading School District grounds, and hundreds of people were instructed how to plant trees and how to preserve them. Representatives of the Association spoke on the subject of tree planting and conservation before granges, schools and conventions, and every kind of meeting, and wherever possible information was given to hundreds as to the beautification of school grounds and public buildings. A move was started to have a shade tree commission for the City of Reading; 150 bird houses were furnished by the Reading School District through Samuel J. Waid to the country schools as samples and these grew into 1500 bird houses in the county; an educational

PLANTING THOUSANDS OF TREES

With several hundred school girls and boys at work, the Berks County, Pennsylvania, Conservation Association was enabled to plant several thousand pine seedlings in one day.

campaign was started and various societies gave prizes for essays on conservation and bird life and wild flowers; and the beautification of the roadside has been started, and an effort is made to form an organization for the purpose of preventing the further desecration of our mountain sides and to finally acquire the mountain sides surrounding the City of Reading."

The officers of the Association are Jonathan Mould, president, Solan L. Parkes, executive secretary, and Daniel K. Hoch, treasurer.

WHITE MOUNTAINS FORESTRY CONFERENCE

NATIONAL Parks, National Forests, and State Forests will be the chief topics for discussion at the annual New England Forestry Conference at the Crawford House, Crawford Notch, N. H., September 5 to 7, 1916. Held in the midst of the new National Forest, which serves also as a National Park, and adjoining the State Purchase of 6000 acres in the Crawford Notch, these subjects of administration will be particularly appropriate.

Mr. Henry S. Graves, Chief U. S. Forester, and Mr. Wm. L. Hall, Associate Forester, in charge of the White Mountain and Southern Appalachian purchases, will be present; also Dr. B. E. Fernow, President of the Society of American Foresters, and Professor Filibert Roth, Director of the Forest School, University of Michigan. It is hoped that Mr. Stephen T. Mather, Director of the National Parks, will make an address.

There will be excursions into the National Forest, on the Presidential Range, and through the splendid forest of primeval spruces on the New Hampshire State reserve.

A cordial invitation is extended to all members of the American Forestry Association.

A TROUT PROBLEM

THOROUGH tests of devices to prevent fish from entering irrigation ditches are to be made by Forest Service officers, who say that thousands of the trout placed in western streams by the Government are killed through being carried into the ditches and washed out on the fields. There are not less than 1200 irrigation projects on or near the National Forests, and in many places the loss of trout is very heavy. The amount of water used in irrigation, it is said, often determines the advisability of artificially stocking the streams.

The Government annually plants large quantities of fish fry in the streams of the National Forests. Last year over 1,100,000 were planted in Colorado and Wyoming alone. This was done to render the Forests more attractive to the public by affording good fishing.

WASHINGTON'S TREES CRITICIZED

By Frank A. Cutting

A SHORT time ago I was in Washington and was particularly disappointed as regards the trees in our National Capital. There had not been much care taken in setting out the young trees. Many of them did not have a good leader and the branches are low and they never can be brought into a condition to make good trees. Many trees have not received the pruning and attention that they should have received.

Shade trees in a city should be selected carefully and of varieties that are long lived and grow to a good size. Some of the old towns in New England have beautiful trees. They are 30 to 40 feet up to the first branches and one can get a beautiful view underneath the branches in all directions. In these best shaded cities and towns we are now enjoying the thorough work that some one did for us a hundred years ago. We should be as careful to provide shade for those who are to come after us. No new street should be accepted if it does not have shade trees. All the streets in Washington that have no shade trees should be studied carefully and the trees that are best adapted for each particular street should be planted at once so that they would soon add to the beauty of the city and comfort of the people.

In country towns and villages, the selectmen should refuse to accept any streets from land promoters until a first-class line of trees has been established on both sides of the street.

Shade trees on the streets and around our homes are of great importance to all the people of the United States, and with a little effort on the part of the people we can have a great improvement in the near future.

Boys, Guns, Birds and Trees

THE relation between forestry and the lad whose father arms him with a toy rifle may not be apparent at first glance. There is, however, a pretty close relationship in some localities and under certain circumstances. Concrete instances point the moral of a tale better than can be done by general statements, says the *Hardwood Record* of Chicago. Everybody with any degree of information concerning the balancing forces

SOFT MAPLE KILLED BY ANTS

The birds which ordinarily would have eaten the ants which killed this tree were driven away by boys. The building in the background is the Central School of Evanston, Illinois. What an object-lesson for teaching children to protect birds this unsightly stump presents!

of Nature knows that but for birds, the insects would devour all the vegetation from the face of the world. For some years past the small boys of the North Shore (some parts, but perhaps not all parts) have been abundantly armed in spring, summer, and fall with toy rifles and have gone forth to shoot without much restraint from parental or municipal authority. These guns are not all harmless toys. Many shoot cartridges and can properly be classed as deadly weapons, while others are air guns and are less harmful, but are none the less nuisances. Boys no more than seven years old have been furnished with such guns and have gone out with boys of larger size to shoot birds. The war against the feathered inhabitants of the woods has increased or decreased, depending on the season, for a long time; but it has never stopped.

Some birds present a much more inviting target than others to the boy with a rifle. None attracts more than the woodpecker. Even the children of the wild Indians killed woodpeckers as their first adventure with the bow and arrow. Though some species are wild and shy, they are not difficult to approach if the hunter is skilful.

The Trees' Best Friends

Trees have no better friends than the woodpeckers. Every forested region has one or more species. The ivory-billed woodpecker holds chief place in southern forests, the hairy woodpecker in the far north, the black

FOR LACK OF BIRD PROTECTION

Boys with rifles and sling-shots keep all the birds away from this section of Evanston, Illinois, and as a result this yellow oak has fallen a victim to ants and other insects and associated fungus which the birds would have destroyed.

ant-eating woodpecker on the Pacific coast; while the central hardwood region is the favorite home of the downy woodpecker (*Picus pubescens*). It is black and white, sometimes with a red feather or two, and in size is rather smaller than a robin. Some call it a sap-sucker. It may occasionally indulge in a sip of sap from small holes which its bill punches in a tree's bark, but its sub-

stantial food consists of insects which it picks from holes in decaying wood. It devours ants by the thousand.

This small, beautiful, harmless bird is the creature against which the boys of the North Shore woods have waged ceaseless and senseless war until it has been exterminated (or apparently so) in many wooded tracts. These are the districts where ants and other insects are now destroying the trees. It is naturally a tame bird. If well treated it will fly about door yards and clean the insects from the shade trees; but it no longer does that in some of the towns along the lake shore north of Chicago. You may now walk through the five miles of beautiful natural woods which have made Evanston famous and the chance is that you will not see a woodpecker, though you will not fail to see numerous trees patched with cement to hide holes eaten by insects and fungus. The rifle in the hands of the uncontrolled small boy has done its work. The surviving woodpeckers know better than to venture across the firing line. For them it is written: "Abandon hope, all ye who enter here." A few miles west, beyond easy hiking distance of the youthful gun-carriers, woodpeckers are abundant on the trees and fences, bearing witness to the fact that they have not fled the country entirely, but have fled to zones of safety.

Local instances of bird destruction and consequent forest deterioration lose much of their general importance if they are found to be only isolated cases. Doubtless many instances like those about the North Shore villages would be revealed by a search throughout the country. In some places game wardens protect birds, and thereby protect forests; and the boy with his rifle does not have as smooth sailing as he has in some of the high-class residential sections northward from Chicago. Every forester knows, and most people in any way connected with woods or the lumber business know, the incalculable service which birds render the forests by destroying insects. All intelligent farmers know how their crops are benefited by the feathered inhabitants of the fields and thicket. Yet, it appears that there is yet room for some primary missionary work along this line.

The two accompanying illustrations show results. The broken snag was once a soft maple tree which stood a few rods from the Central School, Evanston. It fell into poor health and ants attacked it. It soon yielded to the attack. The insects so weakened the trunk that it broke in a windstorm. The ants had penetrated to the centre and left no sound wood, for decay kept pace with the burrowing ants.

The other picture shows a yellow oak near Asbury Avenue, South Evanston. No woodpecker dares venture there, and ants and other insects, and the associated fungus, are doing their deadly work. The tree is now too far gone to be saved. It is still alive, but will succumb in a year or two. Birds might have saved it, but for the boys and their rifles.

These trees are samples only. Hundreds of others could be found, showing the destruction by insects, aided and abetted by the small boys and their rifles which have driven the birds away.

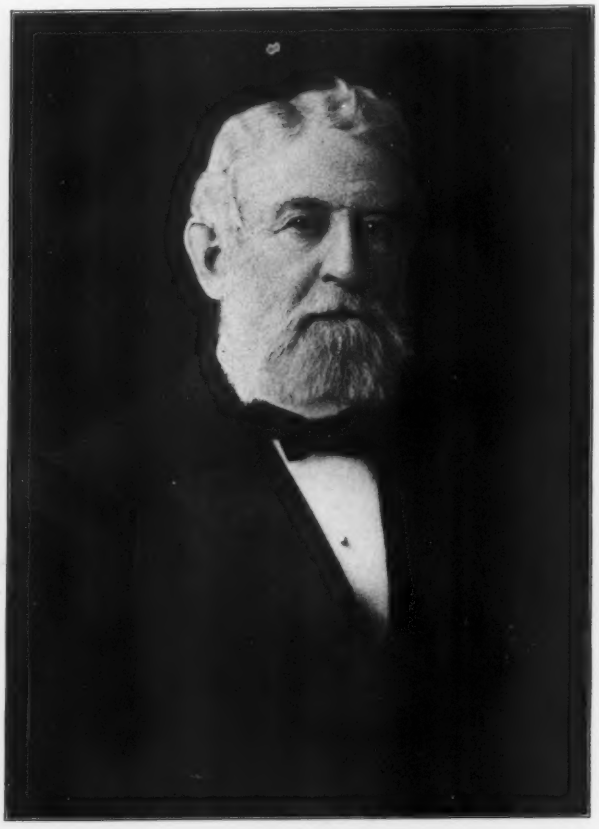
FOREST CONSERVATION

By Joshua L. Baily

Vice-President, American Forestry Association

ARE not the forests themselves better authority on conservation than anything I would be able to suggest? I have been much interested lately in some thoughts concerning the longevity of trees, and their reliability as time-keepers.

Not long ago there died in one of the public institutions in Philadelphia a woman who was said to have lived



JOSHUA L. BAILY, OF PHILADELPHIA
Vice-President of the American Forestry Association.

one hundred and twenty-eight years, but there was no mark upon her person by which her age could be ascertained, nor any record to establish the claim to longevity. Tablets are found in the ruins of ancient cities bearing inscriptions of much historical interest, but they are too often lacking in accuracy.

But the records kept by trees are devoid of all uncertainty; each tree keeps for itself what might appropriately be called "a year book," in which is noted every year as it passes. There are no omissions and no mistakes. Whether the tree has lived a hundred years or a thousand years or four thousand years, the record is intelligible, definite and infallible.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B.A., M.F.

TAKING CARE OF SHADE TREES

IN THE foregoing two papers we have seen the advisability of any city or even local block community undertaking the planting and care of its shade trees. We have also considered ways and means of attaining the necessary organization and decided upon the advisability of having all work coördinated under the head of one bureau, commission or single head.

With the work coördinated, place the responsibility of all tree matters on a professional forester, a man trained in the science of forestry and arboriculture and one of considerable experience in park work. His duties will be to see to all planting, spraying, pruning and cultivating. He will establish a municipal nursery, test the various insecticides and fungicides, install the best apparatus and enforce the city tree ordinances. He will organize the office work, plot the street trees on a map and advise citizens on their tree problems. He will issue permits for tree removals and private tree pruning, study the local tree problems, collect tree statistics and promote public interest through lectures and writing.

The enactment of a good city tree ordinance is the next step. A number of cities now have such ordinances in force and the new one may be modeled from those. The tools to work with are thus provided, and if the trained expert is a good one, the details of carrying out the work may be left to him. The city tree commission, or whatever board has charge, should oversee his work occasionally, give him the benefit of its official support, and back him when necessary, because in the beginning of all such work there frequently appear many cases of opposition from citizens, who, either for selfish motives or otherwise, try to force their own views in the matter of handling technical tree problems.

The attention of the forester will probably be directed first to the care of the existing trees rather than to the addition of new ones.

TREES BADLY PRUNED

Nothing is more unsightly than a row of butchered trees such as here shown. Unfortunately such a sight is all too common, and may be seen in more communities than one cares to count.

Spraying for leaf-eating insects may be his first work. Street trees, growing under less favorable conditions than park trees, are naturally weaker and more susceptible to insect attack. Street elms without care very seldom escape attack from the elm-leaf beetle and such trees as the horse-chestnut and linden are titbits for leaf-eating caterpillars. Let all such spraying be done early while the insect is young and susceptible to the poison. It is also important to look into the chemical and physical value of the insecticide you are using.

A few years ago, I found one of the best known brands of arsenate of lead to contain as little as 4 per cent of arsenate oxide, whereas it should have had 15 per cent or more to be the least effective. Since then, we have been subjecting our spraying material to chemical and physical tests and have been paying considerably less than what we had been paying before.

Success in spraying will, moreover, depend not only on the value of the insecticides and upon how early in its feeding stage the insect is attacked, but also on the thoroughness with which the work is done. The kind of apparatus used will also make an appreciable difference, for a barrel pump is too slow for the amount of labor used to operate it and a very heavy wooden tank, such as is commonly used for woodland spraying, would prove too sluggish and cumbersome in going about the city streets.

In late summer and early fall, *pruning* will be in season. The men should then be trained in the fundamental principles of the work and furnished with printed hints on the necessary precautions in climbing trees and removing branches. We have had little booklets published on such topics for our men and find them very helpful.

Close cuts and application of coal-tar to the wounds should always be insisted upon and, above everything else, do not

let them prune more than is necessary. The tendency on street trees has generally been the other way, to the great detriment of the trees.

Treatment of Cavities

Cavities caused by some old neglected horse-bitten wound, or by an improperly made cut, are more common

RESULT OF NEGLECT

This tree should have been protected with a wire netting guard, but nothing was done for it and the result of this carelessness is evident by a glance at the picture.

in street trees than in park trees, and the present tendency is to indiscriminately fill them all with cement. This work is expensive and in many cases unjustified. It is particularly true of trees on the streets because there the trees are frequently of poor species and the cavities so neglected that the absolute elimination of diseased wood is utterly impossible. There the decay would keep on developing after treatment with the same rapidity as before treatment. Cavity filling is justifiable only where the tree is a much valued specimen, where the filling can serve the practical purpose of eliminating moisture and where every trace of diseased wood can be thoroughly removed before the filling is inserted. In many cases the proper use of the chisel or gouge alone without the filling will eliminate all disease and leave the wound in a position where moisture will not collect. The absolute eradication of all infested wood from a neglected cavity is often impossible and in many cases where this is true, the ax is by far the safest and most practicable tool. Street trees especially should be cut down as soon as they become the least dangerous, or when their trunks become hollow or badly infested with disease. For, as soon as the citizen notifies the

A DANGEROUS PEST

Removing egg masses of the Tussock moth from shade trees.

authorities of the condition of his tree, all responsibility is shifted on the city and law-suits are sure to follow in case of any subsequent damage.

The next consideration to engage the forester's attention will be the planting of trees and that we shall leave for the next issue of the magazine.

BROOKLYN'S TREE PLANTING

Park Commissioner R. V. Ingersoll, of Brooklyn, has undertaken to dot Brooklyn with trees, and will plant 600 at one time along a three-mile stretch of Bedford Avenue.

The trees which Commissioner Ingersoll plans to set out are the Norway maple and the Oriental sycamore. "Both these varieties," he said, "grow rapidly and give ample shade, and prove very hardy in city conditions."

In undertaking to interest property owners in this campaign for street-tree planting Commissioner Ingersoll has developed a force of men to take special care in planting trees. These men see that these trees are properly pruned and otherwise cared for.

"A pail of water every day will do wonders," the Commissioner said. "Another thing to do is to cultivate and work up the soil around the roots. If people knew the splendid results they would obtain by doing just that little bit of work, more of them would be anxious to do it. It is especially necessary to break up the earth around the roots of trees when they are not surrounded by grass plots. Where the grass is absent the soil is apt to be trampled so hard that no moisture can penetrate it."

INQUIRY DEPARTMENT

Send any inquiries about tree conditions to The Editor, American Forestry, Washington, District of Columbia, and they will be answered without charge.

ADVICE FOR AUGUST

1. Commence pruning shade and ornamental trees this month.

2. Transplant evergreens after the 15th of August.

3. Collect and burn egg masses of the Tussock moth and similar insects.

4. Collect and burn cocoons of the bog worm and similar insects.

QUESTIONS AND ANSWERS

Q. Please give me the proper soil elements necessary for vigorous growth of maple, elm, oriental plane, catalpa, poplar, locust, beech and birch, also fruit trees. Present soil is clay and gravel. Are wood-ashes and bone-dust and lime advisable?

W. M. C., *Oakmont, Pa.*

A. Replying to your inquiry, the trees you mention will grow in any ordinary good farm soil. The elm, beech and fruit trees are more fastidious in their soil requirements, and need more moisture than others mentioned. The plane will adapt itself to the ordinary poor soil of the city street and the catalpa and locust will grow in the dry, poor soil. The poplar is the least particular of all and will grow where little else will grow. The addition of bone-dust and wood-ashes is very good, but the lime is more of a local question, depending on sourness, etc., of soil, though a little of it is likely to do good. The best fertilizer that we would recommend for your soil would be well rotted manure dug in thickly.

Q. Is it advisable to remove the extra growth developing in bunches of twigs and leaves on the main branches of elms or oaks? Shall appreciate your advice.

E. L. S., *Cincinnati, Ohio.*

A. The extra growth on the elms and oaks should not be cut off. The vast amount of rain this season in the East has produced a profusion of growth which does the trees good and makes them more attractive. To keep the crown thick with foliage is a good policy for the upkeep of shade trees.

Q. There is a growth or gall similar to the one enclosed on my hickory trees, and I write to see if you can assist me with a cure for the same. The growth is rather round, comes on the young shoots, and in time comes on every shoot so that it stops all growth and the trees die. Some of the largest hickory trees around here are giving up the fight. I enclose a leaf of hickory which ought to be helped by the right spray. The growth is same color as shoot and opens up as specimen of its own accord.

N. W. C., *Eden, N. Y.*

A. Replying to your inquiry, I beg to say that your hickory is affected with what is known as the hickory gall aphid, a species somewhat common and one which occasionally seriously disfigures hickory trees and at such times causes considerable injury. The remedy consists in spraying with lime-sulphur wash in the early spring, and cutting and burning the galls in early summer before the plant-lice have deserted them. The latter method, however, is sometimes very difficult to carry out on account of the large size of the trees. These methods would apply to lawn and shade trees but would not be practical for checking the insect in forest trees.

Q. Please prescribe proper treatment for elm too large to spray conveniently; leaves badly eaten and shrivelled up. Is nicotine spray advisable for maple gall?

W. M. B. C., *Oakmont, Pa.*

A. Relative to your large elm, the eating of the leaves is very likely due to the elm-leaf beetle. Spraying with arsenate of lead in early June is best for it. The grubs of the beetle, however, have a habit of crawling down the trunk to the base of the tree in early August to pupate, and while the insect is in that pupa stage you can collect them at the base of the tree and destroy them. The curling of the leaves is probably due to plant-lice which appear on the under side of the leaves. Spraying with whale-oil soap, one pound to ten gallons of water, is the best method of fighting this insect. Nicotine spray for maple gall, if the tree is large, is too expensive and therefore never used. Use lime-sulphur wash in early spring in place of the nicotine.

Q. I want information in regard to the proper treatment of soil in seed beds to eliminate the growth of weeds.

Can the soil be inoculated with a formula that will destroy weed seeds and not injure the tree seeds? Is there any spraying mixture that could be used after weeds had started to grow that would kill the weeds and not injure the little seedlings?

Any information you can give me on this subject will be appreciated.

D. H., *Dundee, Ill.*

A. Replying to your inquiry I will answer the questions in the order in which they are put.

1. There is nothing that can be put into the seed bed that will keep out weeds, and will not at the same time prevent other vegetation from growing.

The growth of the weeds can be prevented, however, by the following methods:

(*a*) The bed may be started a year previous and allowed to remain without any seeding for the whole summer, and during that summer it should be cultivated frequently in order to kill off all weeds. This is often done, and it is known as "summer cultivation" as a preparation for future planting.

(*b*) Another method may consist of something which is often used by rose growers; namely, to sterilize the soil by the method of steaming. I have heard of cases where this steaming process is applied to outside beds, as well as to heaps of soil within greenhouses. A modification of this method may consist of burning the vegetation in heaps along the bed all through the summer, and in that way producing a weedless bed for the following year.

2. There are a number of mixtures that can be used to destroy weeds, but would not be applicable to beds where seedlings are growing, because they would destroy every other form of vegetation at the same time.

Q. The tops of my beech and birch trees are dying off in large numbers. Please tell me the cause of the trouble and what to do.

L. M. C., *Reading, Pa.*

A. Very likely your beeches are suffering from impoverished soil, insufficiency of moisture or late developing winter injury. We have had complaints from many parts of the East where the beeches were going back the same way. In most of these cases it was not an insect or disease that was responsible, but rather a climatic or soil stress of one kind or another, and where we had a chance to apply a remedy we found that special stimulation of manure, water, cutting back the crown and even artificial fertilizer have helped very much.

The birch trees are very likely affected by the bronze birch borer, an insect which has done a great deal of damage of late years to all species of birch trees. Removing the infested tops and burning them before the grubs have a chance to go too far down is the most practical remedy.

Q. What do you consider the best vine for covering banks?

R. P. R., *Hartford, Conn.*

A. If the spot has plenty of sun, use *Rosa wichuriana*. If it is more or less shaded, you might use Hall's honeysuckle.

A LOGGING ENGINEERING COURSE

THE appointment of John P. Van Orsdel to the position of Professor of Logging Engineering in the School of Forestry at the Oregon State College is an event of some importance in forestry education in the United States, and particularly in the Pacific Northwest. The significance lies in the fact that Van Orsdel is recognized by the big timber operators as one of the foremost logging engineers in the country. The appointment is important, too, in that it demonstrates to the practical timbermen that educational institutions have come to realize the nature of the woodsmen's problems and their responsibilities in aiding in their solution.

JOHN P. VAN ORSDEL
Who has taken the position of Professor of Logging Engineering in the School of Forestry at the Oregon State College.

As a young man, he put in seven years cruising timber, locating and surveying logging railroads and flumes, and planning logging operations generally. During this period he had for his clients the Portland Lumber Company, J. D. Lacey & Company, Hammond Lumber Company, Inman-Poulsen Logging Company, Weed Lumber Company, and practically every other important timber concern in the West. The scope of his activities is indicated by a cruise and accurate resurvey of a 55,000-acre tract for J. D. Lacey & Company in California. In 1910 he established the first firm of logging engineers in the United States. In 1911 he was appointed superintendent of woods operations for the Portland Lumber Company, a position which he still holds. This company is one of the largest operating timber concerns in the world. One of Van Orsdel's achievements with this company was the delivery of 153,000,000 feet of logs in one season.

Mr. Van Orsdel has always been interested in the technical phases of the timber business. He has been a constant contributor to the lumber trade journals and has prepared technical papers for practically every meeting of the Pacific Logging Congress. He devised a scheme for making topographic logging plans and is the originator of what is known as the Van Orsdel bonus system. He is interested in technical logging education. He has been instrumental in inducing several promising young loggers to go to college and has been a non-resident lecturer on scientific logging subjects at the Forest Schools in Washington and Oregon for several years.

In assuming his new line of work, Mr. Van Orsdel will still retain his connection with the Portland Lumber Company. This connection will permit him to take his students out on up-to-date logging operations for first-hand woods instruction. It will also enable him to place students of logging engineering, during vacations, on special lines of logging work in which he desires them to gain experience. The plan will bring the college within reach of every aspiring logger, since he will be able to earn enough to pay his way while he is getting his education.

THE WASHINGTON ARCH WITH WASHINGTON'S PROFILE
This unusual photograph of the Washington Arch in New York City with a striking outline profile of General George Washington was taken recently, when a combination of the tree in full leaf, a building the top of which shows above the tree, and the Arch, all combined to produce a profile of the Father of his Country which is unmistakable. Without the tree the likeness would be missing.

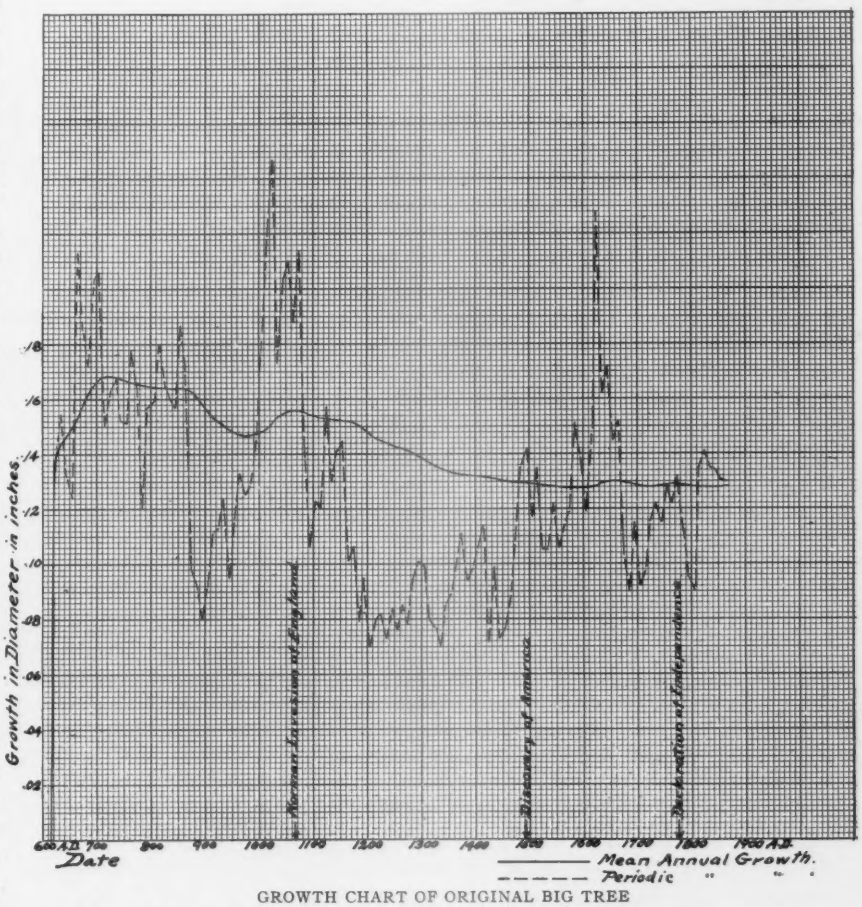
The First Record of a Sequoia

By Donald Bruce

Assistant Professor of Forestry, University of California

WHAT is probably the oldest tree stem analysis on record for the western United States has recently come into the possession of the Forestry Division of the University of California. The measurements were taken on a big sequoia near Eldorado in Calaveras County in the Sierras in 1865. The tree measured 26 feet 6 inches in diameter on the stump, which was six feet above the ground, while its age at the stump point was 1245 years. The form of record is unusual, consisting of a long, narrow roll of paper, 9 inches wide by 14 feet long. On this a pencil centre line is drawn, along which the position of each annual ring is marked by an inked cross line, every tenth line being somewhat longer. The only figures appearing are the serial numbers of the decades entered for quick identification. The preparation of such a record must have involved an enormous amount of labor and its form is far from convenient, but except for the meagreness of the description of the tree it should serve every purpose of a modern stem analysis.

This document was among the records of the late Professor E. W. Hilgard, the eminent authority on soils, and the author of the classic text with which so many foresters are familiar. Shortly before his death he directed that it be given to the newly established Division of Forestry of the University which he had served so long and faithfully.



GROWTH CHART OF ORIGINAL BIG TREE

On this chart are plotted two lines, the broken one showing the average rate of increase in diameter for each ten-year period, and the solid one indicating the average rate of increase during the tree's whole life to each given date.

There is every reason to believe that this is a record of the dimensions of the first of the giant trees to be seen by a white man. The discovery of the species was made in 1852 by a hunter while in pursuit of a grizzly bear which fled into what is now known as the Calaveras Grove. In amazement at the size of this original big tree, the bear was forgotten and the hunter returned to camp to tell his companions of his find. Not unnaturally his story was heard with such complete incredulity that he could not persuade anyone to return with him to examine the tree. After a day's futile effort the discoverer again sallied forth, ostensibly to hunt, and presently returned claiming that he had killed a huge bear and needed help to bring it into camp. This story found so much more ready acceptance that the whole party immediately volunteered to accompany him, and were thus led to the giant tree. The rest of the Calaveras grove was soon found, proving that it was the species rather than the individual which was so remarkable.

Within a year or so the bark was stripped from this original tree and the tree itself, of course, died. It was therefore determined to fell it. Long saws were as yet unknown and axes seemed hopelessly inadequate, so the work was done by boring a series of holes with long pump-augers. Five men worked 22 days, only to find that even after the wood had been completely severed the massive weight of its stem defied all attempts to bring it to the ground. Two and a half more days were futilely

spent with wedges and block and tackle, until at last, just as the effort was being abandoned, a slight breeze sprang up, and with apparent ease toppled over the big tree. Its dimensions are reported as being 25 feet in diameter, measured on the six-foot stump, exclusive of bark, which was fifteen to eighteen inches in thickness, and 302 feet high. That locality, diameter and height of stump should agree with those of the stem analysis seems more than a coincidence, particularly since it is improbable that another tree of such size should have been felled before 1865, the date the measurements were taken.

The age of this tree is far below the figures generally quoted for specimens of the sequoia of that size. Even allowing for the considerable exaggerations which are current as to the longevity of the species, this individual was undoubtedly one of exceptionally rapid growth. The accompanying diagram illustrates this, being in interesting contrast to the typical growth curves with which the forester is familiar. On this chart are plotted two lines, one (broken) showing the average rate of increase in diameter for each ten-year period, and the other (solid) indicating the average rate of increase during the tree's whole life to each given date.

Several points will strike the forester as remarkable. First, the mean growth rises very rapidly to its crest by the end of the first century and yet falls off very gradually after that point so that 1100 years later its average was still within 25 per cent of its maximum. Moreover, its decrease within the last half century is almost imperceptible. Its current growth rate also shows remarkable fluctuations. That the next to the greatest growth during its whole life should have come when the tree was 1000 years old, and some 400 years after its smallest growth, is a striking index of its undaunted vitality. A careful study of the alternating periods of rapid and slow growth lends distinct weight to the impression that climatic cycles rather than the effect of age have dominated the tree's development.

ROADSIDE TREES NEEDED

BY INVESTIGATIONS just completed by the New York State College of Forestry at Syracuse, it has been found that nine-tenths of the roadsides in the rural districts of New York State are entirely void of shade trees. When this is considered along with the fact that last year New York State paid out of the State Treasury about $30,000,000 for the construction and maintenance of roadbeds, it shows that the State is not yet awake to the great need and the great possibilities in rural roadside improvement.

The preliminary survey which has just been made by H. R. Francis in charge of the Landscape Extension work of the College of Forestry, covered nearly 3000 miles of the main lines of highways passing through such important points as Rochester, Buffalo, Jamestown, Olean, Corning, Ithaca, Elmira, Binghamton, Kingston, Albany, Lake Placid, Watertown, Utica, Rome and Syracuse.

During the survey studies were made of such important features in rural roadside improvement and beautification as good and bad varieties of trees found along the highways, views and vistas obtained from the highways, the effects of the shade trees on crops in adjacent fields, the possibilities of the covering of barren embankments and the planting of some desirable sort of vegetation where overhead wires are in large numbers. One of the principal features studied was the condition of the roadbed as affected by the presence or absence of shade trees.

ITALY'S FORESTS SUFFER

A REPORT from Rome says ocean freights on American lumber have increased tenfold since the war began and the Italian Government is beginning to make inroads on its own precious reserve stocks of standing timber.

There are about 16,000 square miles of forest area in Italy, or one-seventh of the total area of the country. Most of the timber wood is found in the Apennine Mountains, which follow the entire length of Italy, beginning north of Genoa and rising out of the fertile plains of Piedmont.

The wood is being used by the Government in large quantities for the construction of soldier barracks at the front, for strengthening trenches, for railroad and foot or wagon bridges along the countless new roads built at the front as a part of the army's transportation system. Much of this lumber is carried piece by piece far above the timber line of the mountains where the soldiers are fighting on barren glaciers.

The kinds of wood being cut in Italy's forests are fir, oak and sycamore, woods formerly imported from Austria. Until recently many shiploads of pitch pine, mostly from the Gulf ports of the United States, were delivered into Italy. But the freight and handling cost has made the price prohibitive.

SELLING BIRCH BARK

AN application to buy all of the bark of black birch on a large water-shed in one of the National Forests in the Southern Appalachians has been received by officers in charge, who say that the bark will be used by the mountaineers to make sweet-birch oil, a substitute for oil of wintergreen. Because of the higher price of birch oil and oil of wintergreen, a synthetic oil is widely used in their stead. The rise in price of salicylic acid, which is the base of the synthetic oil, is reported to have increased the demand for the birch oil manufactured in this country. The oil is largely used for medicinal purposes and for flavoring, and a good demand is said to exist. So-called rheumatism cures in particular contain comparatively large amounts.

The forests in the East purchased by the Government are reported to contain large quantities of birch and are expected to become an important source of supply.

The foresters say that the birch is not a very desirable

tree in the southern mountains. It can seldom be sold for lumber and it occupies ground which could support more valuable timber. Consequently they are glad of an opportunity to dispose of it. The officials state that provision will be made to utilize the tree more closely than has been done in the past, and to regulate the cutting in such a way as to provide for a future supply.

PLANTING TREES IN COLORADO

By J. B. Stoneking, C.E.

BECAUSE of my connection with the School of Agriculture of the University of New Mexico, I am interested in anything that will forward the development and thriftiness of trees in the arid and semi-arid regions.

On a recent trip into Colorado, I made it my business to call on Mr. J. N. Salter, County Horticulturist of Pueblo County, and Mr. W. J. Morrill, State Forester, at Fort Collins, to get their views on a subject that has been much discussed in the public prints recently. I refer to the comparatively new idea of blasting tree holes with dynamite. I had both these gentlemen give me their views in writing so that I might not forget what they said nor misquote them.

Mr. Salter said: "I have seen powder used in planting trees and am frank to say it is the thing to do in planting orchards, especially in heavy or shaly soil. I really think it pays to use it in most of the soils in our state, as one is more apt to get the hole large enough to receive the tree."

Mr. Morrill wrote: "Foresters and arboriculturists generally recognize the efficiency of blasting holes for ornamental tree planting. The recent demonstration at the State Farm leads me to recommend the practice in street tree and lawn planting in hard soil, as the hole can be very cheaply excavated, and the loosening of the soil for several feet around undoubtedly will result in better growing conditions."

I found that a great many trees of all kinds, fruit principally, have been planted in blasted holes in New Mexico, Colorado and Montana, and the method is well spoken of wherever it is known.

The cost of explosives seems to average six or seven cents a tree. This is largely or quite counterbalanced by the saving in labor, as it is no easy task to dig holes with spades in the soil types of this region. But just consider that if it is so difficult to get a spade into them, what chance a tender rootlet has to force its way down and out into feeding beds for the plant food needed to nurture the tree.

The blasting work is very simple. Into an auger hole, twenty-four to thirty inches deep, a quarter-pound charge of dynamite is placed and tamped in. After the blast, the loosened earth is shovelled out, the pot hole at the bottom filled—sometimes with manure at the bottom—then some sub-soil on which the young tree rests, filling around the roots with the richer top soil. The earth is then tramped down firmly with the feet.

LIGHTNING PLAYS FAVORITES

THE United States District Forester at Albuquerque, N. M., has just compiled some very curious figures showing the erratic behavior of lightning in starting forest fires. Yearly records going back as far as 1908 show that out of every 100 fires in the National Forests of Arizona and New Mexico, 40 originate from lightning. This general percentage of lightning fires is well known to foresters, says District Forester Redington, but it is surprising how widely the percentage varies with different localities. In northern and central Arizona, for instance, the proportion of lightning fires runs up to 70 per cent, while in the Manzano Forest near Albuquerque only 3 per cent of the fires are started by lightning. There is no readily apparent rhyme or reason in its behavior. In general, those forests bearing big timber and lots of grass seem to suffer worst, but a notable exception occurs in southern Arizona, where the proportion runs from 40 per cent to 60 per cent in spite of the timber averaging smaller and the grass somewhat sparser than elsewhere.

Forest officers state that the accumulation of figures of this kind is gradually adding very materially to the efficiency of their fire prevention system. It enables them to state the fire hazard on each forest in accurate figures instead of in words, and to calculate the risks mathematically, just as an insurance company does. This in turn makes possible a really intelligent and economical distribution of men and funds for fire prevention.

TREMENDOUS WASTE OF WOOD

THERE are more than 48,000 sawmills in the United States, and their output of waste in the form of sawdust, shavings, slabs, and other wood refuse is estimated as 36 million cords per year. This is equal to over 4½ billion cubic feet of waste, which is the capacity of a bin one-half mile high with a base covering a forty-acre lot. Or, considering each cord to contain eighty cubic feet of solid wood with all the cracks and air spaces taken out, these 36 million cords would make a block of wood more than a quarter of a mile on each edge.

Perhaps one-half of this so-called waste product is not, strictly speaking, wasted, but serves a useful purpose as fuel under the boilers. Much of the remaining 18 million cords not only serves no useful purpose, but in most cases is a source of inconvenience and danger, and costs the mill time and money.

HELP US TO GET 5000 NEW MEMBERS BY GETTING JUST ONE

200 Dead in Forest Fires

FRIGHTFUL forest fires in Nipissing and Sudbury Counties, northern Ontario, in the last few days of July, killed over 200 people, destroyed numerous villages and burned timber valued at hundreds of thousands of dollars. The fires were finally extinguished by rains. At this writing official reports are not in, but the newspapers tell thrilling stories.

At Nushka fifty-seven are known to have perished, says one paper. The French Canadian settlers there had been warned of their danger for three days, but had remained and fought the flames until the fires completely surrounded their village of a score or more of houses.

As the flames reached their homes the frantic residents resorted to any effort to save their lives. There being no river or lake not screened by the flames, many jumped into a single well and their bodies were found piled up above the normal water line.

At Cochrane, with a population of 1700 and the largest town destroyed, the residents fought the fires until the settlement was burning, and then most of them found refuge in a small lake, which soon was completely walled by flames. Into this body of water also plunged many wild animals, driven before the flames, and humans and beasts found a common and comparatively safe refuge, with barely their noses out of the water, while the roaring fires swept on. Eighteen, however, are known to have been killed at Cochrane and thirty-four injured.

At Matheson the relief expedition found thirty-four bodies lying side by side on the station platform of the Temiskaming and Northern Ontario Railroad. The station and two dwellings, far apart, are the only buildings remaining in Matheson.

Ramore, a smaller settlement, was obliterated and what became of its people is not now known. Like the residents of other towns, it is believed they fled through the woods and brush before the flames and probably were overcome and destroyed. Fifteen of Ramore's residents failed to leave in time and their bodies were found in the ruins of their homes.

At Iroquois Falls the great paper mills, costing $8,000,000, and supplying the *Chicago Tribune* and other large newspapers with their print paper, were destroyed, with every other building in the place. All that remains are the stone foundations and brick walls of the plant, which was one of the largest in the world. The loss of life there has not been determined, but it is believed the paper company was able to get all of its employees safely away. The mills were owned by what was known as "*Chicago Tribune* capital."

Everything at Porcupine Junction was destroyed, excepting the railroad station, and it was near there that the rescue train ran through flames miles wide. So intense was the heat that the window panes in the cars were broken and in several places the rails were warped so that the train had to proceed with great caution. All on board the train suffered intensely.

The fire was checked at Timmons after a score of houses had been destroyed, but it was said many persons who had fled in advance of the flames had been overtaken and probably burned to death.

A woman has come out of Kowccash with the story that while she went in search of aid the flames cut off her retreat to her home, which was destroyed, with her husband and their ten children. She said the flames completely encircled Kowccash and Tashota, and that there seemed to be no escape for the many persons trapped there.

A despatch from Toronto, dated July 31st, says: Premier Hearst announced to-night that scores of small settlements have been obliterated, one large town wiped out and another left mostly in ruins; that only a heavy rainfall saved a great part of the province; that 184 lives are known to have been lost; that hundreds of people are homeless and that the Government has taken extraordinary measures to provide for the refugees.

Reports to the Canadian Pacific Railway Company state that the figure of 184 dead represents the number accounted for up to 9 o'clock this morning.

Englehart despatches say the figures on hand early in the day indicated that at least 200 persons perished, with numerous outlying districts to be heard from.

WOMEN'S CLUB RESOLUTIONS

RESOLUTIONS adopted by the General Federation of the Women's Clubs, and reported to AMERICAN FORESTRY by Mrs. Lydia Adams-Williams, State Chairman of Conservation for the District of Columbia, embodied many references to subjects pertaining to forestry.

Governors were urged to set aside Burroughs' birthday, April 3rd, as an annual Bird Day; the American laurel was recommended as our national flower; a bill for a National Park Service was endorsed; measures providing that the Lincoln Highway run through Yosemite Park and that post roads be built on public lands open to settlement were approved; coördination of the work of the various departments of the Government and coöperation between state and nation in the conservation and utilization of the water resources was advocated; the extension of the Weeks Act for the purchase of land in the Southern Appalachians and in New England was urged; extension of time of the shooting season under the Federal Migratory Bird Act was opposed; and measures to prevent birds killing themselves by dashing against light-houses and for protection of Federal bird reserves were approved.

The Nation's Wishing Tree

NEXT to the tree immortalized by Longfellow in the "Village Blacksmith," the National Wishing Tree in Lafayette Square, Washington, D. C., cut down in January, was perhaps our most famous chestnut tree. The chestnut is thought by many to possess wonderful powers over fortune. Perhaps you have had your future foretold by the bursting chestnuts as they roasted on the hearthstone. Perhaps the sight of a familiar chestnut tree recalls the happy day of youth when you went chestnutting, and causes you to wish for a return of those joyous times. And perhaps you have made your wish under the Wishing Tree, and your wish has come true.

The National Wishing Tree was a dwarf chestnut, a scion from the famous Wishing Tree in Hyde Park, London. It was located immediately west of the Jackson statue, and in plain view from all the windows on the north side of the White House.

As implied by its name, the Wishing Tree was supposed to possess a magic charm which caused every wish made under its branches to come true. The "oldest inhabitant," quoted in the *Duluth Evening Herald*, says:

"There is no particular form of wishing, though the park attendant told me many years ago that most of the wishers went up close enough to the tree to put their hand upon its lower limbs. The wish must not be spoken, and must not be divulged.

"About forty years ago I was directed by the editor of the *Daily Chronicle* of Washington, on which paper I was then a young reporter, to explode the stories about the tree; to show that they were the rankest kind of superstition, and that wishes under an iron lamp post or anywhere else were just as likely to come true.

"I proceeded to do the exploding, and was perfectly satisfied that there was a perfect explosion. And so was the editor, Col. Robert Ingersoll, who for many years lived in a house which faced the wishing tree. He became interested in it, and in his many lectures on 'Superstition' he did a great deal more exploding.

"My first personal experience with the tree was when James Buchanan was President. The Prince of Wales—the late King of England—was the royal visitor. Miss Harriett Lane, a niece of the President, walked through the park with the prince one evening, on their way to the residence of Lord Lynn, then the English Minister at Washington, only a couple of blocks away from the White House.

"On their way they passed under the wishing tree, and Miss Lane told the prince its story, and that it was of Hyde Park and English stock. He became enthusiastic and, on her challenge, went under the tree, grasped one of its branches firmly and devoutly made a wish.

"I have seen other royal visitors under the tree, notably the Grand Duke Alexis of Russia, who recently passed away; King Kalakaua, of the Sandwich Islands, during General Grant's administration, and during the Cleveland administration Queen Emsons, of almost equal rank in the royal way.

"This tree is also known to some of the habitués of the park as the nurses' tree, for the nurses gathered around it in preference to any of the other trees. Tea made of its leaves cured many disorders, and is said to have been especially useful in warding off attacks of whooping cough.

"I have been told that Abraham Lincoln, when President of the United States, went personally to the tree one night for some of its leaves, with which to make a draught for his third son, William Wallace Lincoln, the little fellow who died in the White House only a short time prior to the assassination of the President.

"In those days there was a high iron rail fence around the park, the pattern of the present fence around the White House. The gates being locked and no one knowing where the keys were kept, Mr. Lincoln personally helped his coachman as he climbed the fence to get the leaves.

"This tree figured in another way in President Lincoln's life, for it was evidence during the assassination trial that Atzerodt Payne and Dave Harold spent most of the afternoon preceding the tragedy in the seat under the tree. From this seat the best view is obtained of what is taking place on the outside of the White House.

"Singularly enough, it was in evidence during the trial of Charles J. Guiteau, as also in his confessions and admissions, that he, too, had spent a great deal of his time during the five days that he declared he was under an inspiration to kill President Garfield in that identical seat. He used the seat, he said, as others had, for the same reason that actuated the Lincoln conspirators; it afforded the best view of the White House. He also said that he had found that particular seat more restful than any other in the park, and that it was while he was sitting in it that he received the incentive to commit his terrible crime."

THE FIRST SOUTHERN FORESTRY CONGRESS

AT ASHEVILLE, North Carolina, the cradle of American forestry, where, in 1898, Gifford Pinchot demonstrated that forests could be utilized without destroying them, was held the first Southern Forestry Congress, on July 11th to 15th. This meeting was notable for the number of professional foresters in attendance, and for the practical and instructive character of the program. The States of Kentucky, Tennessee, Texas, Maryland, Virginia and North Carolina were represented by their state foresters, three of whom, Besley of Maryland, Maddox of Tennessee and Barton of Kentucky, presented papers on state problems. Louisiana was represented by Professor J. G. Lee and Henry T. Hardtner, whose talk on the practical experiments in

natural reforestation of long-leaf pine was a feature of the session. The National Forest Service was well represented. Chief Forester, H. S. Graves, discussed the southern forests and their place in the national timber supply. Supervisor I. F. Eldredge of the Florida National Forest gave an illuminating talk on the perpetuation of the turpentine industry and W. W. Ashe discussed the forests of the future, second growth, in the light of commercial results. Much attention was devoted to state organization for fire protection, and the fire problem in the southern pineries. This subject was presented by H. H. Chapman of the Yale Forest School. Director J. W. Toumey of the Yale School discussed the regeneration of southern pine forests. President Charles L. Pack of the American Forestry Association called attention to the work of the Association in an address of greeting. This formal program occupied two entire days, during which the attendance was large and the closest interest paid. The evenings were devoted to recreation, consisting of a Dutch supper and a banquet, respectively. The resolutions adopted by the Congress urged the States of Florida, Georgia, South Carolina, Mississippi, Arkansas and Alabama to undertake some form of state forestry organization modelled after the principles successfully worked out in other southern states, of employing technical foresters under boards free from political pressure. The Congress expressed its disapproval of the combination of forestry with fish and game protection either through wardens or commissions as tending towards loss of efficiency in both organizations. It commended the State of Louisiana for passing the recent amendment to the state forestry law creating a fund for forestry, and establishing an advisory board to supervise the expenditure and the employment of a technical forester. Two field days were alternated with this program. On July 12th the Biltmore forest plantations were visited in carriages. These plantations, now fifteen to twenty years old, have proved successful, for the most part, wherever the species was adapted to the soil conditions. Wonderful stands of white pine and short-leaf pine were seen. There were many failures amongst the hardwood plantations on poor soil. The planting of pine was in most instances closely spaced, 3x3 feet, or 2x4 feet, and already shows stagnation due to crowding, bearing out the contention of most American foresters that close planting is more of a drawback than an advantage. On Friday, July 14th, an automobile took the delegates to the summit of Mt. Pisgah, whence they descended to the "Pink Beds," a forest which in the spring is full of laurel bloom, and in the fall shows the pink and red foliage of the chestnut oak. An excursion to Mt. Mitchell was planned for Saturday the 15th, and a few hardy individuals defied a steady rain and took the trip. The rest abandoned the plan. Those who left on Friday or on Saturday to the westward reached home in season. But the Mt. Mitchell excursionists, those who remained in Asheville, and a party of ten foresters, including Forester H. S. Graves, J. W. Toumey and others who left for Washington at 2.30 P. M., all were caught in the tremendous floods of Saturday night when the rain, descending steadily and without wind, the entire night, equalled a total precipitation in 24 hours of from ten to fifteen inches in the various mountain zones. Mr. Graves' party was stalled at Marion, North Carolina, from Saturday night until Friday the 21st, during which time first-hand observations were made of flood conditions and effects.

Many lumbermen, railroad men and private land owners interested in fire protective organizations were present at the Asheville meeting. The delegates were unanimous in the feeling that they had been greatly benefited, and carried away many practical ideas and much enthusiasm. The Congress marks an epoch in the development of southern forestry. It presented in clear, compact form the great progress that has been made and served as an impetus towards further effort in this immense region where the entire problem of future management of forest land is as yet in its infancy. Great credit is due to Dr. Joseph Hyde Pratt, State Geologist of North Carolina, and Joseph W. Holmes, State Forester, for organizing and conducting the affairs of the Congress. A permanent organization was effected, and the above officials were elected president and secretary respectively.

FORESTRY BOARD'S SECRETARY

By General C. C. Andrews

Secretary Minnesota State Forestry Board

In recent numbers of American Forestry there have been articles almost insisting that in the organization of forestry in the various states, the office of secretary of a forestry board ought to be filled by the state forester. If that plan is the best for a state's forest service, it should be followed. But has the subject been carefully enough considered?

A forestry board appoints the state forester, and directs and supervises his work. At its meetings it listens to his statements and recommendations, and then instructs him as to what he shall do. These instructions—some of which he may possibly dislike—are to be carefully recorded and complied with. Does it tend to the best efficiency to have him the recorder and sole custodian of these instructions?

The various states ought now to plant and soon will plant a thousand or more acres of forest annually, and before many years each state will require assistant foresters to manage state forests. At the beginning of the present war in Europe, the German states had in the aggregate 12,000,000 acres of state forest, a trained forester for every 10,000 acres, and planted 100,000 acres of forest annually. It is reasonably certain that the work and responsibility of state foresters in this country will, in a very few years, greatly increase, and, speaking from eighteen years' experience as secretary of a forestry board, I believe that it will be for the public interest that the organ of communication between the forestry board and the forester and keeper of the board's records should be a disinterested person, and not the forester himself.

Editorial

THE FLAW IN INDIANA'S STATE FORESTRY ORGANIZATION

INDIANA has had a State Forestry Board for fourteen years, and a secretary, who by the terms of the law is supposed to be "one who shall have special knowledge of the theory and art of forest preservation and of timber culture." The State has during this period appropriated an average of $8000 per year for forestry work. To-day, those who have the forestry work of the State closest at heart are disappointed and dissatisfied at the results. In adjoining states, under the guidance of trained men, and under plans similar to those contemplated for Indiana, great areas of state forest reserves have been created, state-wide fire protection systems organized, and, more to the point, immense progress has been made in educating farm owners in the proper care of their woodlots and in selection of profitable trees to plant. Demonstration woodlots have been established, lectures given, and bulletins issued. The people of these states are not forced to content themselves with enthusiasm and sentiment—they are guided to the practical application of their impulses by the efficiency of their state foresters.

In Indiana the contrast is sharply evident. As a result of fourteen years' effort on the part of the State Board, which has at all times given conscientious and unselfish service, the State has 2000 acres in Clark County, on which some hardwood plantations have been established, but the educational and publicity work which is the foundation of true state forestry is totally disorganized, inefficient and conspicuous chiefly by its absence. This Board, by the very terms of the law constituted as a non-political body and containing representatives of the faculty of Purdue University, the wholesale and retail lumbermen, and the agricultural interests of the State, has year by year endeavored to fulfil its obligations to the people of the State, only to confess its efforts nullified and barren of results.

What is the trouble? It lies in *the law itself*, which gives the Board no control whatever over its executive officer, the secretary, upon whom rests the duty of carrying out the purposes of the work. In practically every other state similarly organized the Forestry Board appoints its own state forester, who serves the Board but is not himself a member. Other states whose laws prescribe the employment of a technically trained forester have actually employed one, and even when this qualification has not been indicated by law, the state forestry boards have insisted on securing foresters whose ability has been demonstrated by performance. Such foresters are now serving boards in the States of New Hampshire, Vermont, Connecticut, New York, Maryland, New Jersey, Virginia, Kentucky, Michigan, Minnesota, Texas, California, and elsewhere. Indiana, on the contrary, is the only State in this entire nation which has first created a Board of Forestry and then stripped it of all control over its executive officer. In this State the governor appoints the secretary or forester, and the latter is a member of the Board itself. The Indiana law, passed in 1903, demanded of its secretary a special knowledge of the theory and art of forest preservation and timber culture. Even at that time men with the proper training were not lacking from whom to choose. But the first appointee was a school teacher to whom the governor owed a political debt. This secretary remained in office till 1909 and accomplished the purchase of the state forest reserve and its improvement by roads and buildings. Trees were planted, but upon his retirement no records of these plantations could be found, and thus much of the benefit of the work was lost to the public.

In 1909 Governor Marshall made an honest endeavor to secure a capable man. His appointee, while not a forester, and lacking fundamental knowledge of soils, tree culture, and woodlot management, yet had a knowledge of botany and a true scientific interest in forestry. He secured very complete records of plantations and gave to the State practically all that it has ever received of value from the expenditure of the annual appropriations for maintenance. But in 1912, against the protests of the Board of Forestry, who had in him secured a man who was trying to do something, this secretary was removed on the suspicion that he was of the wrong political faith, and a tried and true member of the dominant party was given the office as a plum. During the four years in which he has held office the present secretary has made no pretense either of knowing anything about state forestry or of endeavoring to conduct the work of state forester. Correspondence requesting information on forest planting or woodlot management remains unanswered, the state reserve is left to a caretaker, and the Forestry Board finds itself in an impossible situation.

To allow such a condition to continue would be a confession that Indiana must fail where her sister states have succeeded. One change alone is needed—the Board should appoint and employ its own secretary and forester and must be limited in its choice to men who have received an educational training which fits them for the position. There would be no disposition on the part of a State Forestry Board properly constituted, as is that of Indiana, to employ a man who would render their entire work futile and barren of results. This change should be secured in the coming session of the Indiana Legislature. Nothing else is needed to place Indiana on a par with other states and to justify the further continuance of the forestry work of the State. Without this reform the entire system may well be abolished.

THE VITAL ISSUE

FOR twenty-five years, or since March 4, 1891, when President Benjamin Harrison was given power by Congress to set aside public lands bearing timber as forest reserves, a perpetual struggle has been waged in this country between the advocates of two opposing theories of government. On the one hand are ranged the advocates of individualism, who hold that the greatest good can come only through the passing of all our national possessions into private ownership to be developed and exploited free from government interference or regulation. Opposed to this doctrine are the champions of public control, and especially of retention under public ownership of the remaining non-agricultural lands bearing timber, water power, or minerals, which are still owned by the nation, and their development and use under wise restrictions, for the benefit of the people as a whole. The old traditional policy of the United States, possessing absolute ownership of its vast new territories both east and west of the Mississippi, was to develop this region by disposing of the public title and entrusting all resources of whatever kind to private ownership. The principle of the homestead law, and of the stone and timber act, was to benefit the individual by giving to him 160 acres of farm land or public timber at a cost only sufficient to defray expenses to the Government. A pioneer civilization, with limitless undeveloped wealth in field and forest, rested its hope for rapid growth on the individual. To benefit him, to bestow a rich competence upon whoever had the hardihood to conquer the wilderness, was to create increased values by the very effort of these pioneers, and establish the foundations of civilization.

Our social progress was made to depend upon the frontiers, which became the solution of all pressing problems. The venturesome, the unfortunate, the sons and daughters of farmers on impoverished eastern soils, the city dweller, had only to go west and start life anew, borne along by a contagious optimism and energy which is the ruling spirit in all new communities. The Government, with a lavish hand, gave of its wealth not only to farmers, but bestowed more than 80,000,000 acres of its domain on the western states, to be in turn disposed of by these states, for the most part, with equal liberality, for sums representing but a fraction of their real or prospective value, that the individual might benefit. Railroads received grants whose extent would feed empires. This entire policy, wonderful in the extent and rapidity of its results, and typically American and pioneer in its ideals, is based on the single conception of individualistic effort as the sole means of furthering public or social welfare, and as the only practical method of utilizing for public good the natural resources originally owned by the people, as a whole. Whatever the future may hold in store for us as a nation, it is the sincere hope of every American that we may retain the vigor and independence which is the fruit of this spirit of self-expression.

But civilization is the result no less of the forces of co-ordination, co-operation and of sacrifice of individual prerogatives whenever they conflict with public welfare. When a single theory of government is permitted to dominate, it may end by destroying. If America permits the doctrine of individualism to thwart all efforts at logical and necessary development towards higher and greater ideals, and more permanent and universal content and prosperity, then as practical Americans we must question the infallibility of those who uphold this doctrine.

The withdrawal of public timber lands in 1891 was the first blow struck at this infallibility. Why was this done? Because it had already in that early day been shown that the unchecked operation of the principle of private possession of timber would end by destroying the forest resources of the country, literally "root and branch." The recuperative powers of Nature, sufficient under ordinary conditions to maintain not merely the forest cover but the protection of the more valuable timber trees in the stand, failed before the wide clean sweep of modern logging, and the immense increase and continuity of modern forest fires. It became evident to thoughtful owners that Nature, confronted with new and disastrous forces of destruction, must be aided by man's controlling mind, if the equilibrium were to be restored and future forests assured.

At the outset, it was clear that this demanded a central directing intelligence. The individual, left entirely to himself, has so far consistently failed, through no fault of his own, to subordinate his private welfare and profit to a future and distant goal of communal good. Public sentiment groping for expression, vaguely resentful and apprehensive in witnessing the progressive spoliation of timber resources upon which much of future prosperity is bound to depend, sought means of correction, and still seeks it. Various futile or impractical plans are frequently proposed in state legislatures to force timber land owners to restrict the cutting of trees below certain diameters, or to reforest cut-over lands. These efforts of the public consciousness and foresight to curb the destructive tendencies of individualism have so far been unavailing, and are so opposed to our national traditions that their advisability is seriously questioned.

A second channel of effort, promising better results, was that of public education. To persuade forest owners that better methods of management for their woodlands is possible, still leaves the choice with the individual. Since by far the greater part of our woodlands are and will remain in private ownership, the more that can be done to stimulate owners to care for their property, the better, but if they choose to waste their timber lands, they cannot at present be effectually prevented from doing so.

But what about the remaining timber resources, to which national title was still clear? Should these go the way of all the rest, and be lost to the people through the operation of the homestead laws, stone and timber claims, placer mining locations, land "scrip" and other means of obtaining patents? Should the nation relinquish its remaining store of public timber, to be despoiled in turn, and then in

the future be forced by the fearful consequences of economic folly to repurchase these very lands, as we are now doing in the Appalachians? A ruined forest can be restored to natural condition wherein the valuable timber trees predominate only by excessive cost, and often not at all. Worthless weeds and brush, persistent and vigorous, exclude the desired pines and hardwoods. On the other hand, the forest in its natural state can be so handled that the per cent of the better timber trees is greatly increased in the new crop. But to accomplish this the logging must be done under regulations and supervision of an extremely intelligent type, based on close scientific study of soil, light, seeding and other factors, whose control means success, and whose neglect spells failure. Once determined, the rules are simply applied and the increased cost of logging is neither impractical nor unreasonable.

American intelligence gave but one answer to this problem. The public timber lands must be retained, and their wealth of timber made available only under expert supervision. This idea is diametrically opposed to the primitive plan of reckless disposal, yet falls far short of state socialism. It is, in effect, the application of the same business principles between the public and the private corporation or individual as are made the foundation of all transactions between two persons. An owner of timber lands has, by right of his possession, the power to fix the terms under which a logging contractor may cut and remove the standing timber. He will, if he is wise, draw a contract in such form that the minimum of damage will be done to his forest. This "revolutionary" principle, adopted in 1891, and under which 160,000,000 acres of public timber lands are now being managed, consists in applying the same idea to public property. Thus, the *use* of the timber, through timber sales, is encouraged, logging contractors do business as usual, and there is no change in the economic situation, except that public consciousness has awakened to the point of guarding its future interests effectively upon those lands which it still owns and controls. Private corporations can still obtain the timber, but they can no longer get it on their own terms and completely ignore the rights of the original owner; no longer cut indiscriminately and abandon the land or attempt to sell it to farmers as agricultural or fruit land, for which it is wholly unfit.

In adopting this simple but effective change in our public land policy, we have made a distinct step towards modifying and curbing the dangerously destructive tendency of individualism as applied to forest lands. The same tendency is manifested in the prolonged struggle over water-power legislation, involving technical questions so deep that the general public despairs of understanding on which side lies the right. The control or retention of coal lands, oil lands and other minerals brings on the same point. What we must determine as Americans is this: Does our present and future welfare depend more closely upon unchecked and unregulated private acquisition of public resources, or upon their retention under public ownership, and development under contracts or leases, by which private capital is regulated in the interests of the public good? This is an economic question which we must master and decide now. Once these lands have passed into private hands, we have made our choice and the cost of reacquisition may be prohibitive.

The champions of unbridled private acquisition, by appealing to popular tradition, equity between states, Americanism, distrust of government, and opposition to bureaucracy, and by urging the primal reason of development and prosperity, seek to throw dust in the eyes of the public, and profit as of old, by obtaining from complacent congresses and officials the right to do as they please through actual possession of title. Are we to permit ourselves to be deluded by these arguments, or shall we awaken as a people to the full measure of our national responsibility, and hold with a firm hand the control of our great but dwindling national timber lands and other resources? "Without a vision the people perish." Let our vision be the strong blending of private enterprise with public regulation, that we may show to the world an efficiency equal to that displayed by our neighbors across the seas, and a preparedness sufficient to cope with any crisis.

$10,000,000 FOR FOREST ROADS

ONE of the provisions of the Federal aid road bill, which was signed by the President on July 11, appropriates $1,000,000 a year for ten years to be spent by the Secretary of Agriculture for the construction and maintenance of roads and trails within or partly within the National Forests.

The bill provides that, upon request of the proper officers of the states or counties, the money shall be used for building roads and trails which are necessary for the use and development of resources upon which communities within or near the National Forests are dependent. The work is to be done in coöperation with the various states and counties. Not more than 10 per cent of the value of the timber and forage resources of the National Forests within the respective county or counties in which the roads or trails will be constructed may be spent. Provision is made for the return of the money to the Treasury by applying 10 per cent of the annual receipts of the National Forests in the state or county until the amount advanced is covered.

Officers in charge say that the bill will make possible the construction of many roads which are greatly needed. Since 1913 ten per cent of the receipts of the National Forests have been used in road and trail building, but the funds have been inadequate to meet the needs. Many isolated communities within the National Forests are entirely dependent on the Government roads and trails. The money now made available will permit the construction of many roads necessary to open up inaccessible territory.

Lumber Uses

By Warren B. Bullock

THE greatest development for public information of the need for conserving American forests has been seen since the tenth of July at Chicago, in the lumber classification hearing conducted by the Interstate Commerce Commission, in which all freight traffic conditions involving the lumber industry are being exhaustively studied, both from the standpoint of the lumberman and the carrier. The public, however, is being shown the great need for nation-wide steps for the conserving of the forests by the testimony of the lumbermen of the great waste in the industry, owing to the inability of the lumbermen, because of traffic and general trade conditions, to utilize the bulk of their wood supply. It was shown that nearly 65 per cent of the nation's forests is wasted, and never reaches the consumer in any form. Some of the manufacturers have testified that they are able to utilize part of the waste of their mills in converting smaller products of the log into box lumber, but in many cases they are too far from the market to make this utilization of their timber profitable.

THE hearing was scheduled to take up the problems of classification of lumber products, but soon became a general study of the entire lumber business in its shipping relation to the public. Better shipping conditions, it was testified, would greatly aid the lumber manufacturers in utilizing the portions of the tree which are now wasted. Some interesting testimony was given on the relation of mills to their timber supply, and the need for the cheap transportation of logs to the mills, and the necessity for the mills moving to the timber supply when freight rates become too high, owing to the increasing distance from the forest to the mill. There is a point, it was testified, when the mill can not afford to ship the log to the mill, because of the distance to be traversed, and when such time comes it is necessary to move the mill to the source of supply. The need for favorable freight rates to allow the shipment of portions of the log which would otherwise be wasted was thus emphasized. If suitable shipping conditions can be assured, the lumber manufacturer can find a market for portions of the product which do not produce at present sufficient revenue to pay for shipment to the market.

THE World's Salesmanship Congress at Detroit provided another phase of the need for economy in wood products, and the preservation of the sources of future wood supply, in the forcing home of the realization of the part efficient salesmanship may provide in saving the lumber supply. Proper salesmanship, it was shown by several speakers, will, by efficient disposal of the product of the mills, prevent an economic waste, by raising the standards of wood using to the point where profits for the manufacturer will be high enough to enable him to turn his attention to the utilization of waste. At present the lumber manufacturer is so closely pressed that he can only afford to market the cream of the forest, where the national need is for a market condition that will force him to utilize every portion of the tree. If the market for the cream of the forest is sustained to a point where the manufacturer is actually making a profit on his entire investment, the nation can require him to manufacture and sell the "skim milk" that is now thrown away.

OF ALL the woods used in the manufacture of tobacco pipes, French briar is undoubtedly preferred by the majority of smokers. This is the root of the white heath (*Erica arborea*), or "bruyere," which grows extensively in southern France and in Corsica. The white heath is a shrub which sometimes grows to a considerable size. The roots are gathered in large quantities, cleaned and sawed into pipe blanks or blocks of various sizes and shapes, after which they are placed in a vat of hot water and simmered for 12 hours or more. This gives them the rich yellowish-brown hue for which the best pipes are noted.

The value of the French briar pipe blanks imported into the United States for the year 1915 was almost $300,000. In addition to this, there were imported, also, a large number of finished pipes.

The present scarcity and high price of French briar has led a number of pipe manufacturers in this country to look for a substitute, and quite a good deal of mountain laurel root is now used. This root is quite similar in appearance to the French briar root, but is softer and burns out more readily. Uncle Sam's Forest Products Laboratory is making some experiments in the hope of finding a satisfactory method of hardening this wood, so that it will not burn out. Several pieces have already been hardened to a very appreciable extent, but the process has not yet been perfected.

The laboratory has also been seeking substitute woods which will not need to be treated. At least one of these woods gives good promise of meeting the requirements of that class of pipes which are now made of applewood, though it does not have the figure typical of briar. It is of interest to note that the State of Pennsylvania alone uses over 120,000 feet of applewood yearly in the manufacture of pipes, and this is more than half of the total consumption. Other species, in the order of importance,

are as follows: French briar, red gum, ebony and birch. Other woods used in the making of pipes are olivewood, rosewood, and osage orange. The laboratory has started an investigation of the wood and roots of a number of the various species of chaparral which are so abundant in the State of California, and which give promise of yielding material the equal of French briar in every way.

FEW realize the important part that wood plays in the manufacture of shoes. Practically every shoe is shaped over a wooden last, the life of which, owing to the very rough usage and the frequent changes in styles of footwear, rarely exceeds one year. About twenty million lasts are produced annually at a cost of over one and one-half million dollars. The greater portion of these are made from maple, the price of which has advanced to such a degree that the manufacturers are forced to find a suitable substitute or to decrease their manufacturing costs. One of the most expensive items of the manufacturing process is drying the wood. At present the rough turned last blocks are air-seasoned under cover for several months and then kiln-dried. This necessitates a large investment in stock, interest on the investment, fire insurance, and the cost of repeated handlings. In an effort to eliminate a considerable portion of this expense one of the large manufacturers is cooperating with the forest products laboratory in an effort to perfect a method of kiln-drying the blocks green from the mill. Sufficient progress has been made to indicate that a solution of this problem will be found. Hundreds of rough turned green blocks are being dried in the laboratory experimental kilns in a very short time and with promising results.

Wood Preserving Department

By E. A. Sterling

THE continued popularity of creosoted wood-block pavements is indicated by the new contracts which are coming out from time to time during the summer. These include 66,140 square yards of streets in York, Pennsylvania, specifications for which call for wood block, as well as other materials, involving a total of about 2,400,000 feet of lumber. In Kansas City the contemplated pavements will involve about 39,227 square yards; while Fort Worth, Texas, has awarded a contract for about 30,000 square yards on the main street in that city.

A MEETING of Committee No. 2 of the American Wood Preservers' Association on Specifications for the Purchase and Preservation of Treatable Timber was held on July 22nd, in Chicago. The chairman, Mr. A. R. Joyce, presided, and plans were made for the work of the Committee during the year. These involve recommendations of specifications for insertion in the "Manual," an analysis of the conditions which influence the availability and cost of railroad cross ties for treatment, an investigation of the life and service of treated ties and other material in the East and Southeast, and other details on the subjects assigned.

AS PART of the educational work which the lumber industry is now engaged in, exhibits showing models of farm buildings, samples of commercial woods, and other interesting materials, will be shown at a number of the larger state fairs this fall. These exhibits will include samples of treated material, such as creosoted fence posts, creosoted barn sills, and boards and smaller dimension timbers which it would be profitable for the farmer and home builder to use. Although the preservative treatment of timber has become so well established as a commercial practice, it remains more or less a mysterious process to the small consumer, and the aim is to show how simple and economical the practice is when applied to small quantities of wood for home use. In a recent bulletin of the National Lumber Manufacturers' Association on "Preservative Treatment of Farm Timbers," it is stated that "The saving is another point which does not need to be reckoned closely, since it is so certain that satisfactory results will be obtained. From the many cases where pressure creosoted timber has shown no signs of decay for 40 years or more, down to the extra life which a light brush treatment will give, many gradations in results are obtained. There is no question as to the economy of a creosoted cottonwood post, which lasts 20 years, when one without treatment decays in three or four, nor of having sills, basement flooring, fences, gates and lumber in many other forms last at least two or three times the normal life.

"The most enthusiastic advocates of treated material are those who have used the largest quantities. Most of the large railroads of the country creosote their cross ties and bridge timbers, and from this large use down to the smallest consumer, results are almost invariably obtained which are in keeping with the thoroughness and care with which the work is done. By creosoting all farm timbers exposed to decay, and by using reasonable care to secure at least a uniform coating or penetration, a saving will result which will make for economy, permanence, and attractiveness of nearly all farm structures."

What Our Members Think of American Forestry

"Enclosed is $3.25 to renew my membership for 1916. This is one of the subscriptions I like to make."

H. R. CHRISTIE,
Victoria, B. C.

"Allow me to congratulate you on the wonderful new dress and features of AMERICAN FORESTRY, which is now one of the very handsomest of all class or other publications published anywhere, and should surely appeal, not only to your regular clientele, but also to all who are interested in outdoor life as well as the special subjects on which it treats."

J. G. WILLIAMS,
Boston, Mass.

"I wish to congratulate you on the very entertaining and valuable Ornamental and Shade Tree Department in the AMERICAN FORESTRY. Among my circle of friends I have heard most favorable and high praise."

N. M. GOODYEAR,
Carlisle, Pa.

"I shall take this opportunity to say a word of commendation for your magazine. It has been a great help to me, personally, in keeping me in touch with forestry even though I am not, at present, following the course I studied while in college. The fellows who frequent our reading-room appreciate the value of the magazine and constantly refer to it."

F. H. HOEHLER, *Executive Secretary,*
Y. M. C. A., Cincinnati, Ohio.

"I want to congratulate you upon your admirable number of AMERICAN FORESTRY for February and the splendid and timely achievement in getting an article on Pine Rust."

JOHN B. WHITE,
Kansas City, Mo.

"Your publication is an admirable one—instructive and interesting—and I want to see it succeed."

W. C. EGAN,
Highland Park, Ill.

"The addition of a Department of Arboriculture to the magazine enhances its already very great value. The change of form and broadening of scope accomplished last year greatly improved an already excellent publication. The spirit and tone of its editing are such as to make every member of the Association feel a pride of ownership in and coöperation with it."

GEORGE W. ROSKIE,
Custer, S. D.

"We can justly feel proud of the AMERICAN FORESTRY magazine. It surely has made great strides in the last few months."

EUGENE W. MENDENHALL,
Clintonville, Ohio.

"I am delighted with the magazine more and more all the time, and even though I am not doing active Club work this year, I am just as good a forester as ever, and look for the magazine each month."

MRS. FOSTER ELLIOT,
Los Angeles, California.

"I want to say I greatly appreciate the wonderful improvement in AMERICAN FORESTRY in the past few months. It must become a wonderful factor in our conservation movement."

CHARLES N. THOMPSON,
Buck Hill Falls, Pa.

"I find your magazine, AMERICAN FORESTRY, very instructive and beautiful."

MARY AMORY GREENE,
Croton-on-Hudson, N. Y.

"Please let me take this occasion to compliment you on the great improvement both in form and substance which AMERICAN FORESTRY has undergone. It has developed into a most excellent magazine of great educational value. I am hearing praises of it on all sides."

DON CARLOS ELLIS,
San Francisco, Cal.

"I like the magazine very much indeed and gladly subscribe to what all your other friends have been saying about it all these last months. May it keep on prospering and win more friends both for itself and for the great cause for which it speaks."

REV. EUGENE BUECHEL, S. J.,
Pine Ridge, S. D.

"I have just had time to look hastily over the magazine for June. It is a beautiful piece of work, and I hope will receive a little of the large amount of appreciation it deserves."

R. S. KELLOGG,
Chicago, Ill.

"I am a great admirer of your journal, and as we grow several of your trees here the detailed descriptions—botanical and commercial—have interested me very much."

W. B. HAVELOCK,
Brocklesby Park, Lincolnshire, England.

"I find the Bird Department very useful."

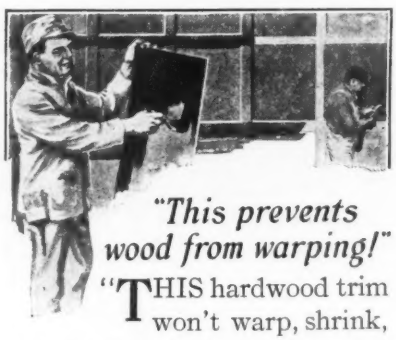
MISS M. B. BANKS,
Westport, Conn.

"I want to compliment you very highly upon the splendid manner in which you 'made up' the Douglas Fir article. I feel that it will do much to acquaint the general public a little more specifically with the characteristics and merits of the Northwest's greatest wood."

J. S. WILLIAMS,
Seattle, Wash.

"I enjoy AMERICAN FORESTRY greatly and count it very valuable. Have loaned copies to men at our plant which may result in new subscriptions later on."

E. E. ALEXANDER,
Green Spring, W. Va.



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Chaffee Leaves State College

Professor R. R. Chaffee, who has been for five years Professor of Lumbering in the Department of Forestry at the Pennsylvania State College, leaves September 1st to take a position as Forest Engineer with Wheeler & Dusenberry Lumber Company, Endeavor, Pennsylvania.

Mr. Chaffee graduated from the Harvard Forest School in 1910. He was in United States Forest Service in District 6 from 1910 to 1911 and since that time has been connected with the Forest School at the Pennsylvania State College. He has had charge of the work in lumbering and has specialized in forest utilization, logging and milling methods and products. At Endeavor he will devote considerable time to forest utilization, laying out of future operations, analysis of production costs, etc. While at State College he has been in charge of the trips which are made by the senior class. These logging trips have carried him into the Lake State region, Southern Pine region, the Cypress region, the Adirondacks and the Appalachian hardwood region. He is a member of the Society of American Foresters and of the American Forestry Association.

H. J. Kaestner Resigns

H. J. Kaestner, who for the past couple of years has been the forester for the Department of Forestry, Game and Fish of West Virginia, has resigned and accepted a position with the Wm. M. Lloyd Lumber Company of Philadelphia, Pennsylvania. He reports the work there as particularly pleasant, as he is back in his home city after an absence of six years.

Credit to Dr. Purdue

Dr. A. H. Purdue, state geologist of Tennessee, was inadvertently not given credit for taking the excellent photograph in the first part of the article by W. R. Mattoon in the May issue of AMERICAN FORESTRY.

Forest School Personals

Dr. H. P. Baker of the State College of Forestry at Syracuse addressed the members of the Conservation Department of the Federated Women's Clubs of America at the Conservation Conference held in New York City. The subject of Dr. Baker's address was "State Forestry." About 600 women were in attendance at this conference.

At the recent meeting of the Southern Forestry Congress held at Asheville, North Carolina, Dr. Baker, of the Forestry College at Syracuse, gave the response from the North. Two films of motion pictures, showing the activities of the College in instructional and extension work through the State, were also exhibited at the Convention.

Professor F. F. Moon of the College of Forestry at Syracuse attended the recent meeting of the Pennsylvania Forestry Association held at Reading, Pennsylvania.

The Beal Nursery

In honor of Dr. William James Beal, professor emeritus of botany at the Michigan Agricultural College, the forestry nursery maintained by the Forest Service at Tawas, Michigan, has been given the name of the "Beal Nursery." Dr. Beal was the first man to make forest plantations in Michigan and for over forty years has been closely identified with the subjects of botany and forestry. He is a widely known writer on these topics and is a member of a number of scientific associations. In 1910 he retired from active work and now makes his home at Amherst, Massachusetts.

The Beal Nursery supplies planting stock for the Michigan national forest. It has a present annual capacity of about 100,000 seedlings and transplants, which will be increased to 500,000. The trees will be used for reforesting denuded areas.

Annual Forestry Conference

The annual forestry conference in the White Mountains will occur at the Crawford House in the Crawford Notch, New Hampshire, September 5th to 7th, 1916.

This conference, under the auspices of the Society for Protection of New Hampshire Forests and the New Hampshire State Forestry Commission, held at a central New England point, has come to be a gathering place for New England Forestry interests. This year the program will be no less interesting and varied. Dr. Fernow, Director of the School of Forestry at the University of Toronto and President of the Society of American Foresters, will be present, as will Professor Filibert Roth, Director of the Department of Forestry, University of Michigan, and William L. Hall of the Forest Service.

The keynote of the meeting will be national forest administration in view of the fact that the Government has lately acquired 305,000 acres or 477 square miles in the White Mountain region.

There will be addresses illustrated with lantern slides showing the situation in the National Forest in the West and the new National Forest in the Southern Appalachians and in the White Mountains. Excursions will be made to different parts of the National Forest near the Crawford House and into the magnificent primeval spruce timber that stands nearby upon the 6000 acres of forest land in the Crawford Notch recently acquired by the State of New Hampshire.

A New Seedman

Thomas J. Lane, of Dresher, Pennsylvania, for the last fourteen years with Thomas Meehan and Son, of Dresher, Pennsylvania, who have recently discontinued the seed business, which they had conducted for fifty years, has taken up the seed business in his own behalf and his thorough knowledge of the business makes him feel confident that he will do well.

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Canadian Department

By Ellwood Wilson

Secretary, Canadian Society of Forest Engineers

B. M. Winegar, Forester to the Operating Department, Eastern Lines, Canadian Pacific Railway, has just returned from a trip through the Maritime Provinces. The Canadian Pacific is planting trees and shrubs around the stations and also planting trees to take the place of the snow fences made of boards which are used to keep the snow from drifting on the tracks in winter.

Major J. B. White, of the 224th Forestry Battalion, C. F. E., has cabled that he will soon return from England to recruit another Woodmen's Battalion, of which he will be the Colonel.

Lt. C. H. Morse, 224th Forestry Battalion, C. F. E., writes from Bramshott Camp, England, that the men are hard at work learning infantry drill and tactics as well as doing logging work.

The extraordinarily wet spring has been most favorable to tree growth in Quebec, Norway spruce showing already nearly a foot in height growth, Scotch pine and white pine, fifteen inches, and Jack pine, eighteen to twenty-four inches. Insect pests have not been troublesome except the elm-leaf aphis.

Mr. Arnold Hanssen, member of the Canadian Society of Forest Engineers, and for four years with the Laurentide Company, Ltd., in the Forestry Division, is going to Yale this fall for a post-graduate Forestry course.

Mr. H. C. Schanche, who has been with the Laurentide Company, Ltd., in the Forestry Division, is returning to Penn State to finish his Forestry course.

Mr. Earle Spafford, who was for some time with the Forestry Division of the Laurentide Company, Ltd., and is now with the Tobacco Products Company, in Boston, came to Grand Mere to arrange for a long vacation trip into the northwoods of Quebec this fall.

In spite of the successes of the Allies, recruiting is as active as ever and several new infantry battalions are soon to be authorized.

Mr. L. M. Ellis, of the C. P. R. Forestry Staff, writes from Calgary that so many men have enlisted and there is such a demand for labor in munition factories and in construction work that the farmers will have extreme difficulty in obtaining labor to harvest their crops.

Five men were graduated in forestry at the University of New Brunswick on May 17th. Messrs. C. E. Maimann, who is now a corporal in the 58th Howitzer Battery at Fredericton; Mr. James Burns, who takes up work as an instrument man in a Crown land survey party going out near Campbellton; Mr. Leland S. Webb, who goes out on reconnaissance work with the Dominion Forestry Branch in Manitoba; Mr. Edwin Hall, who will be in Saskatchewan, and Mr. Colby S. Jones, who will likely take up the work of lumbering with Jones Brothers, at Apohaqui, New Brunswick.

Among the other forestry students going out on work for the summer are George Miller, James Smart and Leo C. Kelly, of the Junior class, with the Dominion Forestry Branch. With the Crown Land Department of the province, in parties now organized, are: R. Melrose, R. D. Jago, Percy Crandall, A. M. Brewer, Austin P. McDonald, Cy Young and Lee S. Kilburn. Prof. R. B. Miller will also be engaged with the Crown Land Department on the study of growth and volume.

Public sentiment in Canada on the question of forest protection and the need of guarding more than five thousand wood-using industries from the menace of forest fires has reached a point which none of our governments, Provincial or Federal, can safely ignore. Through the efforts of the Canadian Forestry Association and other bodies, the facts regarding Canada's dependence upon cheap and abundant wood supplies, and the enormous damage wrought annually by preventable fires, have been made matters of common information in town and country from coast to coast.

Three field parties are now at work in New Brunswick, in connection with the forest survey and classification of Crown lands. The project is under the supervision of P. Z. Caverhill, provincial forester, subject to the general direction of the Minister of Lands and Forests. The size and importance of the undertaking is indicated by the fact that the Crown lands in this province comprise 10,000 square miles and return a direct revenue to the provincial treasury averaging more than half a million dollars annually from timber alone, in addition to large revenues from the sale of hunting and fishing privileges.

C. H. Morse, Assistant Inspector of Forestry Branch at Alberta, enlisted with the Foresters' Battalion and up to the time of this writing he states that his company had not got down to the actual work for which the battalion was formed. One of the best

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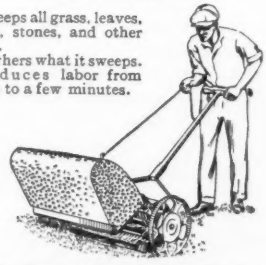

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Alberta rangers, J. A. Hutchison, of the Brazeau Forest staff, is also leaving, and it is his intention to join the aviation service. Forest Assistant Macdonald of the Bow River has also completed his Officer's Training Course, although up to the present time he has not yet been assigned to a battalion.

Aside from the above changes there has been little change in the personnel arrangements at the Alberta branch, with the exception that Mr. R. C. St. Clair, formerly with the C. P. R. Forestry Branch, has been employed by the Branch and is assigned as Forest Assistant on the Crowsnest Forest. Forest Assistant Manning, who, up until this spring, was on the Clearwater Forest, has been transferred to the Alberta office at Calgary and will conduct special lines of work essentially in connection with timber sale and timber permit administration.

Fire-fighting Combination

A new fire-fighting tool has been invented by a forest ranger in California which consists of an interchangeable hoe and rake. It is said to be the best tool of the sort yet devised.

Osage Orange for Dyes

The use of Osage orange for making dyes promises to be extensive. The Forest Products Laboratory is making a census which shows that the supply of the wood is more than ample to meet present needs.

Current Literature

MONTHLY LIST FOR JULY, 1916

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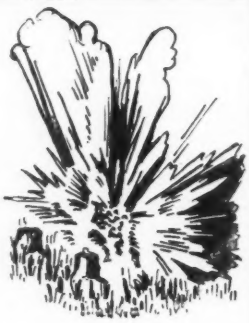

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal coöperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by coöperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

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